

THE FISHES OF THE UNITED STATES ECLIPSE EXPEDITION TO WEST AFRICA.

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INTRODUCTION.

The collections on which this paper is based are primarily contained in the United States National Museum. The first and most extensive is that obtained by the United States Eclipse Expedition to West Africa in 1889, with William Harvey Brown as naturalist. Collections of fishes were secured by this expedition at the Azores, Cape de Verde Islands, Ascension Island, Sierra Leone, Ashantee, Angola, and Cape Town. An interesting collection was received from Rolla P. Currie and a few specimens from Messrs. O. F. Cook and G. N. Collins, collected in Liberia.

I have further included several small collections from Liberia and the French Kongo, long in the Museum of the Academy of Natural Sciences of Philadelphia. Dr. J. P. Moore sent a few from the French Kongo, from the Biological School of the University of Pennsylvania, and others were sent, through Capt. C. F. Silvester, from Princeton University, obtained in Kamerun. These are all indicated under their respective captions, where reference is given at the beginning of the principal faunal papers.

Five imperfectly-known species are figured, together with the following, which appear to be new:

Julis azorensis.

Abudefduf ascensionis.

Mormyrus goheeni.

Labeo curriei.

Tilapia savagei.

Eutropius eclipsis.

Caranx angolensis.

The types representing these species are all in the United States National Museum. In further explanation of the figures all the new forms are drawn from the types, and the others in the National Museum are:

Belone trachura Valenciennes. 42150.

Liosaccus cutaneus (Günther). 42143.

Chaetodon sanctae-helenae Günther. 42311.

Alticus textilis (Valenciennes). 42318.

The types of *Holopteryx plumbea* Cope, and *Syngnathus pellegrini*, new species, are in the Academy, and numbered 22964 and 975, respectively, in the catalogue of that institution.

Acknowledgment is here offered to the authorities of the United States National Museum for the privilege of reporting on their collections, and also to Doctor Moore and Captain Silvester for the loan of their material used in this connection.

DESCRIPTIONS OF SPECIES.

1. HORTA, FAYAL ISLAND, AZORES.

Pereira-Guimaraes mentions fishes from the Azores and Madeira Islands.¹ Hilgendorf published the first comprehensive list² and described *Salarias symplacos* as new,³ afterwards identified as *Blennius galerita* Linnaeus, by Collett, in his report on a small collection.⁴ Clark notes a short list of species obtained by the *Scotia* at Horta,⁵ and finally Regan has studied an interesting collection.⁶

BELONE TRACHURA Valenciennes.

Head, $2\frac{3}{4}$; depth, $1\frac{1}{5}$, in postocular part of head; D. 11, 12; A. 11, 17; P. 1, 10; V, 1, 5; scales along lateral line about 238 to caudal base; 11 scales above lateral line to dorsal origin, and 4 below to anal origin; about 129 predorsal scales to occiput; head width about $1\frac{1}{3}$ in postocular region; eye, 2; interorbital, $1\frac{3}{4}$.

Body elongately fusiform, somewhat pentagonal in transverse section with median dorsal and upper lateral ridges all distinct, greatest depth median. Caudal peduncle broadly depressed, width four-fifths of eye and least depth about $2\frac{3}{4}$.

Head depressed above, flattened sides moderately converge below, so depressed under surface about three-fourths of eye. Snout tip shorter than lower jaw by nearly an eye-diameter, basal width at rictus $7\frac{1}{2}$ its length, surface smooth. Eye ellipsoid, supraorbital cavity slightly bulging upper profile of head. Pupil ellipsoid, large. Maxillary concealed, about reaches eye. Jaws not completely capable of closing basally. Teeth small, largest of upper twice length of lower, none on vomer or palatines. Nasal cavity large, about half size of pupil, triangular, and oblique keel down from its lower

¹ Journ. Sci. Lisboa, vol. 8, 1883, pp. 30-39 (133); vol. 37, 1884, pp. 11-28.

² Arch. Naturgesch., vol. 54, 1888, pp. 205-213.

³ Sitz. Ges. Naturf. Fr. Berlin, 1888, p. 79.

⁴ Arch. Math. Naturv. Christiania, 1897, 19, No. 7, 17 pp. See also Res. Camp. Sci. Prince de Monaco, vol. 10, 1896, pp. 1-198, pls. 1-5.

⁵ Scottish Nat. Ant. Exp. Zool., vol. 4, Fishes, 1915, p. 380.

⁶ Ann. Mag. Nat. London, ser. 7, vol. 12, 1903, pp. 344-388.

front edge over preorbital. Interorbital broadly concave, supra-orbitals with fine striae slightly converging toward occiput, and few low median keels. Postocular space to preopercle edge about seven-eighths of eye.

Gill-opening forward about opposite eye center. Rakers $iv+15$, ix, lanceolate, short or about one-third of filaments and latter slightly over half of eye. Isthmus narrow keel.

Scales narrowly imbricated and crowded along sides and lower surfaces, down back medially much larger and broadly exposed. Broadly exposed scales over most of upper surface of head, and extending forward on snout for space equal to $1\frac{2}{3}$ eye-diameters. Fins scaleless, except area converging out over caudal of lateral keels, extension about three-fourths of median rays from bases. Lateral line complete to caudal base, not to latter, and along caudal

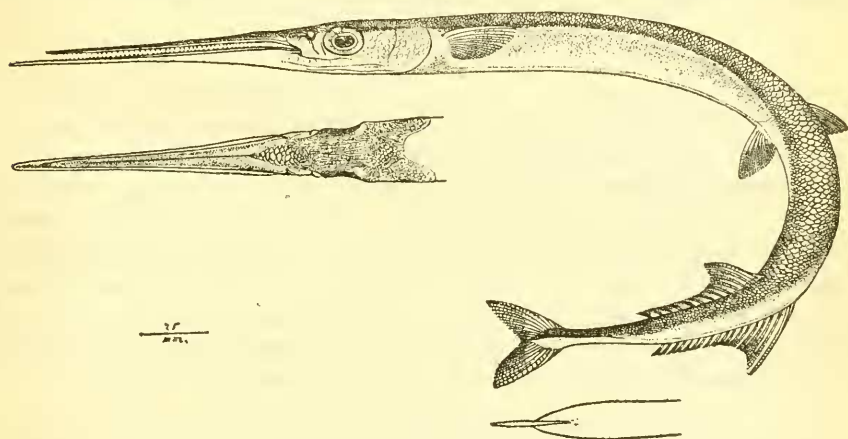


FIG. 1.—*BELONE TRACHURA* VALENCIENNES.

peduncle behind extends along lower surface of flange or keel. Each tube with several short branches below.

Dorsal inserted slightly behind anal origin, nearly at last third between depressed pectoral tip and caudal base, first branched ray $1\frac{1}{4}$ in postocular region, lobe of fin not quite half of fin length. Anal with large lobe in front, first branched ray about long as postocular region. Caudal (damaged) moderately forked, and lower lobe apparently slightly longer. Ventral inserted about midway between hind preopercle edge and caudal base, fin $1\frac{1}{3}$ in postocular region. Pectoral slightly longer than postocular. Vent nearly three-fifths of eye-diameter before anal.

Color in alcohol deep brown on back and upper surface of head. Along upper side of postocular region, dusky line to end of gill-opening separating silvery-white color of sides and lower surface, but not on trunk. All along edge of dark upper tint, which bounded

on trunk by upper lateral keel, tinge of dark greenish. Iris pale. Fins all pale brownish, with dusky on outer portions.

Length, 450 mm.

Type.—Cat. No. 42150, U.S.N.M.

Also four other examples, showing: head, 3 to $3\frac{1}{3}$; depth, $1\frac{1}{2}$ to $1\frac{1}{3}$ in postocular region; D. II, 12, once 11, 14; A. II, 17; scales about 212 to 223 in lateral line to caudal base; about 123 to 135 predorsal scales to occiput; rakers, III to VI+4 to 6 V to XI; eye $1\frac{2}{3}$ to 2 in postocular; interorbital $1\frac{3}{4}$ to 2; least width of caudal peduncle, 2 to $2\frac{2}{5}$; length, 379 to 429 mm.

My examples differ from the accounts by Valenciennes¹ and Günther² in the constantly fewer anal rays, or 19 instead of 20 to 21, partly pentagonal body, slightly more advanced ventral and apparently larger scales. In structure the scales show the circuli complete, very fine, or simply convergent.

SCOMBER COLIAS Gmelin.

Head, $3\frac{3}{5}$ to $3\frac{3}{4}$; depth, $5\frac{1}{5}$ to $6\frac{1}{4}$; D. X—II, 10+5; A. III, 10+5; snout, $2\frac{3}{4}$ to 3 in head measured from upper jaw tip; eye, $4\frac{1}{3}$ to $4\frac{1}{2}$; maxillary, $2\frac{2}{5}$ to $2\frac{3}{5}$; interorbital, 4 to $4\frac{1}{2}$; second dorsal spine, 2 to $2\frac{1}{10}$; first branched dorsal ray, $4\frac{1}{6}$ to $4\frac{1}{3}$; pectoral, $2\frac{1}{4}$ to $2\frac{1}{3}$; ventral, $2\frac{2}{5}$ to $2\frac{1}{2}$; rakers, 16+30. Maxillary about to eye front. Front nostril about three-fifths of eye-diameter before eye. Interorbital flattened. Spinous dorsal inserted about midway between hind nostril and soft dorsal origin. Pectoral about one-fourth to one-third in depressed spinous dorsal. Ventral inserted near first third of depressed pectoral. Two examples, 229 mm.

TRACHURUS PICTURATUS (Bowdich).

Head, $3\frac{1}{4}$ to $3\frac{1}{2}$; depth, $4\frac{1}{2}$ to $5\frac{1}{2}$; D. VIII—I, 30 to 34; A. II—I, 25 to 29; scutes in lateral line, 49 to 56+45 to 52, and of latter usually 4 to 8 on caudal base; snout, 3 to $3\frac{1}{3}$ in head measured from upper jaw tip; eye, 3 to $3\frac{2}{3}$; maxillary, $2\frac{2}{5}$ to $2\frac{1}{2}$; interorbital, $3\frac{3}{4}$ to 4; rakers, 16 or 17+39 to 41; length, 132 to 205 mm. Fourteen examples.

Trachurus trachurus (Linnaeus), of the Mediterranean, is close to the present species in the broad scutes in the first half of the lateral line, apparently differing in their fewer number, 79 to 86, compared with 94 to 108 in *T. picturatus*. Both species have far more scutes than *T. semispinosus* (Nilsson) in which they are said to be 70 to 75. Compared with examples from California (San Pedro and Santa Catalina) of *T. symmetricus* the present form shows several striking differences. It has the lateral line much wider, as width of upper two-thirds and lower three-fifths of eye, compared with width of upper one-half and lower two-thirds in eye in *T.*

¹ Hist. Nat. Poiss., vol. 18, 1346, p. 339.

² Cat. Fish. Brit. Mus., vol. 6, 1866, p. 235.

symmetricus. The eye is much larger in *T. picturatus* and the pectoral is also slightly longer. The scutes are within the same variable limits in both species, my Californian material showing 50 to 54+46 to 52, though with rakers apparently slightly more numerous, 16+45. The example I recorded from Valparaiso, as the present species is *T. symmetricus*.¹ It has scutes 50+50.

Scales of all three species are variable, though usually with three basal striae more or less marginal. The circuli are fine, but little coarser on middle of scale.

The Australian *Caranx declivis* Jenyns² is shown with broad scutes as in *T. picturatus*, 82 in number, with about 50 on drawing as spinescent in straight part of lateral line, though it has a few more soft dorsal and anal rays than any of my examples of *T. picturatus*. Bowdich originally published a wretched figure and his description says soft dorsal with 17 and anal with 15 rays.³

CAESIOMORUS GLAUCUS (Linnaeus).

Head, $3\frac{3}{5}$ to 4; depth, $2\frac{1}{2}$ to $2\frac{3}{4}$; D. VI—I, 1, 25, once 24; A. II—I, 1, 23 to 25; snout, $3\frac{1}{5}$ to $3\frac{1}{3}$ in head; eye, 4 to $4\frac{1}{4}$; maxillary, $2\frac{2}{5}$ to $2\frac{3}{4}$; interorbital, $2\frac{1}{8}$ to 3; scales, 127 in lateral line to caudal base and 4 more on latter. Body well compressed, contour evenly fusiform. Caudal peduncle compressed, depth $\frac{1}{2}$ to $\frac{3}{5}$ its length. Predorsal keel forward till over nostrils. Head compressed, sides about evenly approximate above and below. Snout conic, long as wide or length four-fifths of width. Eye round, advanced, hind edge midway in head length and adipose lid around edges. Maxillary slightly beyond eye front, expansion $2\frac{1}{2}$ to $2\frac{2}{5}$ in eye. Mouth oblique, jaws about even. Teeth minute, in narrow bands, resolving into 1 or 2 irregular narrow rows along sides of jaws. Narrow band of very minute teeth, and similar ones in small arrow-shaped line on vomer. Nostrils small, together, about two-thirds of eye diameter before eye and level with its upper edge. Least infraorbital width slightly over one-fourth to one-third of eye. Rakers 14 to 16+28 to 31, lanceolate, slightly longer than filaments. Scales cycloid, rounded, largest along lateral line opposite soft dorsal and anal. Patch of scales on front of cheeks behind maxillary, and another behind eye, head otherwise naked. Spinous dorsal begins little nearer soft dorsal origin than hind eye edge, spines low, second to fourth subequally longest or about $1\frac{1}{6}$ to $1\frac{1}{8}$ in eye. Soft dorsal inserted about midway between snout tip and eye, or little nearer caudal base, front of fin elevated though not as lobe and first branched ray $1\frac{3}{4}$ to $1\frac{5}{8}$ in head. Soft anal similar, only first branched ray $1\frac{1}{8}$ to $2\frac{1}{5}$ in head. Caudal very deeply forked, long slender pointed

¹ Copeia, No. 34, Aug. 24, 1916, p. 64.

² Excurs. Madeira, 1825, p. 123, pl. fig. 27.

³ Zool. Voy. Beagle, Fishes, 1842, p. 68, pl. 14.

lobes about equal, $2\frac{3}{4}$ to $2\frac{4}{5}$ in combined head and trunk. Pectoral short, pointed, $1\frac{2}{5}$ in head. Ventral inserted slightly before spinous dorsal, $1\frac{3}{5}$ to $2\frac{1}{5}$ in pectoral. Color in alcohol with silvery-white reflections, back dusky with dark bluish tint, lower surfaces whitish. Fins largely dull brown, dorsal and anal front tips black. Each caudal lobe largely dusky above and below, leaving hind edge broadly paler. Pectoral axil dusky, fin like ventral, with somewhat yellowish-brown tint. Six examples, 163 to 334 mm.

These agree with a series of 19 Italian examples of all ages. Rakers and scales fewer in young than in adults, and scale structure identical in all.

SERRANELLUS ATRICAUDA (Günther).

Head, $2\frac{2}{3}$; depth, $3\frac{1}{3}$ to $3\frac{1}{2}$; D. X, 15, 1; A. III, 8, 1; scales along and just above lateral line to caudal base, 120 to 126 and 12(?) to 18 on latter; pores in lateral line 73 to 80 to caudal base and 3 or 4 more on latter; 10 scales above lateral line, 28 to 30 below; predorsal scales 28 to 34; snout $3\frac{2}{5}$ to $3\frac{3}{5}$ in head measured from upper jaw tip; eye, 5 to $5\frac{1}{3}$; maxillary, $2\frac{1}{4}$ to $2\frac{1}{2}$; interorbital, $5\frac{2}{3}$ to $6\frac{2}{3}$. Body compressed, rather fusiform. Head well compressed. Snout about broad as long. Eye advanced, hind edge about midway in head length. Maxillary to eye center, expansion $1\frac{1}{5}$ in eye. Mouth large, lower jaw slightly projecting. Strong canines in front of jaws and along mandible sides. Nostrils close, front one nearly half an eye-diameter before eye. Interorbital flattened. Preopercle edge finely serrated, serrae but slightly coarser below. Rakers, v 3 + 11 ii or iii , lanceolate, long as filaments, or $2\frac{1}{2}$ in eye. Pseudobranchiae about $\frac{2}{3}$ of gill-filaments. Scales finely ciliated, with 6 to 12 basal striae. Cheek with 18 rows of scales. Muzzle, interorbital, preorbital and top of head naked. Fourth dorsal spine longest, $2\frac{2}{3}$ to 3 in head. Soft dorsal inserted little nearer caudal base than eye, front rays little longer, second ray $2\frac{2}{3}$ to $2\frac{3}{5}$ in head. Third anal spine longest, $3\frac{1}{2}$ in head. Soft anal like soft dorsal, third ray $2\frac{1}{3}$ in head. Caudal slightly emarginate, upper lobe little longer. Color in alcohol generally dark brownish. Below lateral line along sides row of 4 or 5 large square dusky-brown blotches and streaks of same color between each. Above lateral line color largely dark brown. Pale blue oblique line along upper maxillary edge or impression. Another parallel from below eye front to cheek corner. Dusky spot below eye front and on cheek at end of maxillary. Fins brownish, edges of unpaired blackish. Upper and lower corners of caudal and anal end black. Soft dorsal, anal, caudal and caudal peduncle rather sparsely marked with small bluish dots. Pectoral pale brown. Ventral with dusky shade. Iris brown. Three examples, 170 to 245 mm.

BOOPS BOOPS (Linnaeus).

Head, $3\frac{3}{5}$ to $3\frac{5}{8}$; depth, $3\frac{5}{8}$ to $4\frac{2}{5}$; D. XIV, once XIII, 14, once 13; A. III, 15, once 16; scales 72 to 80 in lateral line to caudal base, and 5 or 6 more on latter; 5 to 7 scales above lateral line and 12 to 14 below; 20 to 24 predorsal scales; snout $3\frac{1}{2}$ to $4\frac{4}{5}$ in head; eye $2\frac{7}{8}$ to $3\frac{1}{3}$; maxillary $3\frac{1}{2}$ to 4; interorbital, $2\frac{7}{8}$ to $3\frac{1}{5}$; rakers, 7+18 to 20, lanceolate, two-thirds to little less than filaments and latter about half of eye. Seven examples, 85 to 207 mm.

These agree with a series of Mediterranean examples in the Academy, though some of the latter vary greatly in depth. The scales of all show about 10 to 12 basal striae.

PAGELLUS CENTRODONTUS (Delaroche).

Head, 3; depth, 3; D. XII, 10 or 11; A. III, 12; scales 75 to 78 in lateral line to caudal base and 6 to 8 more on latter; 6 or 7 scales above lateral line, 16 or 17 below; snout, $3\frac{2}{5}$ to $3\frac{1}{2}$ in head; eye, 3; maxillary, 3; interorbital, $3\frac{3}{5}$ to 4; rakers, 13+19, lanceolate, about long as filaments, which 2 in eye; 7 scales on cheek. Two examples, 98 to 108 mm.

Compared with a Mediterranean example 130 mm. long, scales of all finely ciliated and with 6 to 10 basal striae. None of the other Mediterranean examples, long in alcohol, show the dark shoulder blotch distinct, and only a slight trace in the Horta examples.

PAGELLUS ACARNE (Risso).

Head, $3\frac{1}{2}$ to $3\frac{1}{6}$; depth, 3; D. XII, 10 or 11; A. III, 10; scales, 70 to 72 in lateral line to caudal base and 6 or 7 more on latter. Body fusiform, elongate, moderately compressed. Head well compressed, sides flattened. Snout about wide as long. Eye large, slightly advanced, long as snout or $3\frac{1}{2}$ in head. Mouth little inclined, lower jaw shorter. Maxillary reaches slightly beyond eye front, not quite to pupil. Front teeth fine and conic, and hind teeth two rows of molars above and below. Front nostril pore about two-fifths of eye before same, and hind nostril large slit close behind. Interorbital broadly convex, wide as eye. Preorbital depth $1\frac{2}{5}$ its length. Preopercle edge entire. Rakers, 10+13, lanceolate, nearly equal filaments or $2\frac{1}{2}$ in eye. Pseudobranchiae long as gill-filaments. Squamation very compact, scales narrowly imbricated, each with 9 or 10 basal radii, latter rather obsolete with age. Suprascapula edge little jagged. Most of caudal covered with minute scales. Lateral line nearly concurrent with dorsal profile, elevated along side of caudal peduncle. Cheek with five rows of scales. Dorsal spines pungent, slender. Soft dorsal inserted about midway between spinous dorsal origin and caudal base, front rays little elevated. Anal similar, spines slender and third longest.

Caudal forked. Pectoral not quite to anal, long as head. Ventral spine, $1\frac{2}{3}$ of fin, latter $1\frac{1}{2}$ in pectoral. Color in alcohol uniform brownish, sides and below with traces of silvery white. Dorsal tinted, with dull brown. Pectoral axil and base with large dusky-brown blotch. Two examples, 189 to 241 mm.

PAGRUS PAGRUS (Linnaeus).

Head, $3\frac{1}{2}$; depth, $2\frac{3}{5}$; D. XII, 10, 1; A. III, 8, 1; scales, 53 in lateral line to caudal base and 9 more on latter; 7 scales above lateral line, 15 below; snout, $2\frac{1}{2}$ in head; eye, $3\frac{3}{4}$; maxillary, $2\frac{4}{5}$; interorbital, $3\frac{1}{4}$. Body oblong, well compressed, upper profile evenly convex from snout tip to soft dorsal. Head well compressed, sides flattened. Snout, width $1\frac{1}{2}$ its length. Eye large, midway in head length. Maxillary about to eye. Molar teeth biserial. Pair of small canines in front of each jaw behind which patch of villiform teeth. Front nostril about half an eye-diameter before eye. Interorbital convex. Preorbital width equals eye. Rakers, 8+9, short stumps about one quarter of filaments, latter $1\frac{2}{3}$ in eye. Pseudobranchiae large as gill-filaments. Scales narrowly imbricated, about 11 basal striae on largest. Cheek with seven rows of scales. Suprascapula edge nearly entire. Scales very small on top of head, below suprascapula, on pectoral and caudal bases, and along soft dorsal and anal bases. Tubes in lateral line simple, largely concurrent with dorsal profile and little high along caudal peduncle side. Dorsal spines rather slender. Soft dorsal inserted about midway between spinous dorsal origin and caudal base, fin low. Anal similar, second and third spines subequally longest. Caudal deeply forked. Pectoral little longer than head, reaches second anal spine base. Ventral spine $\frac{3}{4}$ of fin, fin $1\frac{2}{3}$ in pectoral. Color in alcohol, dull uniform brownish generally, with traces of bright silvery-white on sides and below. Length, 241 mm.

DIPLODUS SARGUS (Linnaeus).

Head, 3 to $3\frac{1}{2}$; depth, $1\frac{7}{8}$ to $2\frac{1}{4}$; D. XII, 13, 1, or 14, 1; A. III, 13, 1, or 14, 1; scales 60 to 65 in lateral line to caudal base, and 6 to 8 more on latter; 8 or 9 scales above and 16 to 18 below lateral line; snout, $2\frac{2}{3}$ to 3 in head; eye, $2\frac{2}{3}$ to $4\frac{1}{3}$; maxillary, 3; interorbital, $2\frac{7}{8}$ to $3\frac{1}{4}$; rakers, 7 or 8+9 or 10. Three examples, 70 to 260 mm.

One of the above from Loando, Angola (p. 284). It has three rows of molars above and two below and slightly larger and longer anal spines than the largest example, from the Azores. In the last axilla and hind edge of opercle flap dusky and preorbital, about seven-eighths of eye. In young axilla and opercle flap pale, preorbital but slightly over half of eye, and molars in three rows above and two below. Young in alcohol with back olive, grayish where scales have fallen, with six vertical lines or narrow bands of deeper

olive-brown down to abdomen, also dark or slaty blotch on front of caudal peduncle. Fins, pale brownish, ends of ventrals and median caudal rays dusky. Head, iris, and sides with silvery reflections.

An example from Messina, Italy, agrees best with the largest of the above. It has the dark axillary blotch, though shorter pectoral. Rakers, 8+10; length, 216 mm. The scales of all the examples alike, finely ciliated, and with many as 9 basal striae.

CHROMIS CHROMIS (Linnaeus).

Head, $3\frac{1}{2}$; depth, 2; D. XIV, 11; A. II, 11; scales, 19 in upper arch of lateral line and 11 pores in straight section before caudal base; 4 scales above lateral line to spinous dorsal origin, 10 below to spinous anal origin; 27 predorsal scales; snout, $3\frac{3}{4}$ in head; eye $3\frac{1}{6}$; maxillary, 3; interorbital, $2\frac{3}{4}$. Body greatly compressed, elongately ellipsoid. Caudal peduncle compressed, length two-thirds least depth, which two in head. Last with flattened sides, width $1\frac{3}{8}$ its length. Snout, convex; length, about $\frac{3}{4}$ its width. Eye large, rounded, advanced, hind edge little behind middle in head length. Mouth small, inclined but little from vertical, lower jaw slightly protruding. Lips rather fleshy. Maxillary almost to eye, expansion $2\frac{2}{5}$ in same. Teeth conic, outer row slightly enlarged, in narrow bands in jaws. Nostril simple pore near last fourth in snout. Interorbital convex. Preorbital narrow, 3 in eye, edge entire, also preopercle edge. Rakers, 10+21, lanceolate, slender, equal filaments, or $2\frac{1}{5}$ in eye. Scales large, finely ciliated, with 7 or 8 basal striae, of smaller size about bony edges and top of head. Preorbital with two irregular rows of scales and four rows on cheek. Very small scales on fins basally. Lateral line with upper arch only to soft dorsal origin, tubes simple. Spinous dorsal inserted behind pectoral origin or about opposite ventral origin; fourth spine longest or slightly less than half of head. Soft dorsal greatly posterior, behind soft anal origin and third or longest ray forming fin point, $1\frac{3}{8}$ in head. Second anal spine much longer than first, $1\frac{1}{8}$ in head; fin origin little nearer caudal base than pectoral origin. Soft anal larger than soft dorsal, pointed behind with seventh ray longest or $1\frac{3}{8}$ in head. Caudal elongate, deeply forked, long lobes sharp pointed, longer than head by eye-diameter. Pectoral pointed, long as head. Ventral reaches anal, first ray filamentous, spine half of fin. Vent half an eye-diameter before anal. Color in alcohol dull uniform brownish with slight olive tint; back and head above, dusky. Spinous dorsal, front half of soft dorsal, first two-thirds of soft anal and outer halves of each caudal lobe black. Remaining portions of soft dorsal and anal, and caudal, whitish. Pectoral pale, also ventral, though latter with front edge and base brownish. Iris brown. Length, 140 mm.

JULIS AZORENSIS, new species.

Head, $3\frac{1}{3}$ (without teeth); depth, $4\frac{2}{3}$; D. IX, 12, 1; A. III, 12; P. II, 12; V. I, 5; scales, 60+10 in lateral line to caudal base, and 8 more on latter; 4 scales above lateral line to soft dorsal origin; 20 below to spinous anal origin; 16 predorsal scales; head width, $2\frac{1}{2}$ its length; snout, $3\frac{2}{3}$; eye, $5\frac{1}{2}$; maxillary, $4\frac{1}{4}$; interorbital, 5; second dorsal spine, $4\frac{2}{3}$; first dorsal ray, $2\frac{3}{4}$; second anal ray, $2\frac{1}{2}$; caudal, $1\frac{3}{8}$; pectoral, $1\frac{1}{2}$; ventral, $2\frac{1}{8}$.

Body much elongated, well compressed, deepest at hind opercle edge and tapering gradually back to caudal, edges convex. Caudal peduncle strongly compressed, about long as deep and least depth about $2\frac{1}{2}$ in head.

Head elongately rhomboid, well compressed, sides slightly flattened and about evenly approximate above and below. Snout conic, upper profile slightly concave in front; width, $1\frac{1}{4}$ its length. Eye rounded, advanced, with hind edge little before center in head

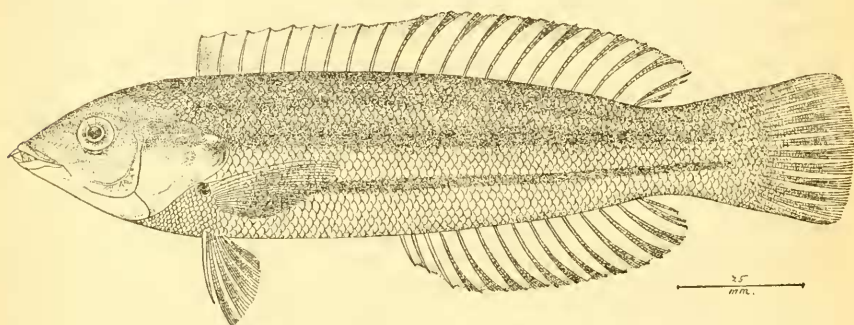


FIG. 2.—JULIS AZORENSIS.

length. Mouth moderate, gape extending about halfway to eye; jaws and teeth about even in front. Maxillary about reaches opposite front nostril. Lips moderately wide, fleshy. Teeth biserial, outer row much larger, and four canines in front of each jaw, of which median pair of each much larger. Tongue small, elongate, end free and rounded. Nostrils small, near one another; front one about half an eye-diameter before eye. Interorbital convex. Least width of preorbital about seven-eighths of eye. Hind preopercle edge entire.

Gill-opening forward about opposite hind pupil edge. Rakers 8+11 short flexible points, spinescent, about one-fourth of filaments, and latter two-fifths of eye. Isthmus triangular, with median keel.

Scales thin, in even longitudinal rows, elongate, well exposed, cycloid. Head naked. Scales smaller on predorsal, breast, and caudal base. Scales with about 18 basal radii and twice as many apical obscurely, circuli very fine. Lateral line complete, high along

back at first, then drops just before caudal peduncle until midway on side and extends out on caudal base. Tubes largely simple, well exposed.

Spinous dorsal inserted well before hind opercle edge, about over pectoral origin; spines more or less subequal, and first not elongated. Soft dorsal inserted about midway between front eye edge and caudal base; fin of about uniform height, and edge like that of spinous dorsal, slightly notched. Anal inserted opposite soft dorsal origin, with weak spines of which third longest and rayed fin like soft dorsal. Caudal oblong, truncate behind. Pectoral pointed from upper rays, which longest, reaches three-fourths to anal. Ventral origin very slightly before pectoral origin, fin half way to anal and spine two-thirds of fin. Vent close before anal.

Color in alcohol largely brown above on back and head. Paler below with tinge of buff. Dark color of back not strongly contrasted with paler lower colors. Well-defined dark line from pectoral axil to caudal base little below middle. Cheek and opercles brown above. Small black spot less than pupil on opercle flap near tip above, also another at pectoral origin. Membrane between first two dorsal spines deep brownish, and entire dorsal fins otherwise pale or dull buff. Other fins buff. Iris brassy-yellow. Length, 170 mm.

Type.—No. 42127, U.S.N.M. Horta, Fayal Island, Azores, November 3, 1889. Wm. Harvey Brown.

Only the above unique example, allied with *Julis atlantica* (Günther)¹ in its uniform spinous dorsal and slender body. In these points it differs strikingly from Mediterranean examples of *Julis julis* (Linnaeus) before me. From Günther's species it may easily be distinguished by its shorter ventrals and coloration. Günther describes two broad dark longitudinal bands, one along the back and the other from the pectoral to the caudal base medially, a black spot at the end of the opercle, dorsal, and anal each narrowly edged blackish with broad violet band along middle, caudal corners dark, ventral filaments blackish and no black axillary blotch. Its size is not given.

I have compared *Julis giofredi* (Risso), from the Mediterranean, and find it allied in the uniform spinous dorsal, though differing in the much smaller inconspicuous axillary black spot, which a mere speck in most. It is not even indicated by Bonaparte² and Valenciennes.³ The lower band on the side extends from the head below to the pectoral base and the caudal base, in *J. giofredi*, and said to be yellow in life, though evidently all faded in my Italian and Mediterranean examples. They show only a whitish parallel line between

¹ Cat. Fish. Brit. Mus., vol. 4, 1862, p. 197. Sierra Leone.

² Hist. Nat. Pois., vol. 13, 1839, p. 271.

³ Fauna Italica, Pesc., vol. 2, 1841 (117) fasc. 30, pl. 2.

it and dark color on back, latter bounded by a dark band from snout to median caudal base.

(For the Azores where the type was obtained.)

BALISTES VETULA Linnaeus.

One example, 305 mm. to caudal base, 535 mm. to end of caudal filaments.

LACTOPHRYS NOTACANTHUS (Bleeker).

Head, $2\frac{1}{2}$; depth, $2\frac{1}{8}$; D. 1, 9; A. 1, 9; eye, 3 in snout; snout, $1\frac{1}{4}$ in head to upper angle of gill-opening; interorbital, $2\frac{1}{2}$; caudal, $1\frac{1}{4}$. Preocular spine slightly over half of eye. Median keel of back with distinct small spine at last third between hind eye edge and dorsal origin. Caudal peduncle unarmed. Color in alcohol with each scute with submarginal ring and central spot of darker brown than body color, all of which, somewhat variable at ring, may be waved slightly in places and central spot appear as if formed of several blotches. Length, 266 mm.

Apparently distinct from the West Indian *Lactophrys tricornis* (Linnaeus), none of my examples having the erect dorsal spine before the dorsal fin as in the above. Bleeker's species is without the bridges behind dorsal and anal fins, where each edge ends in a backwardly directed spine. Günther admits it ¹ only as a variety and says "examples from the West Indies with an indication of the dorsal spine are by no means uncommon."

LIOSACCUS CUTANEUS (Günther).

Head, $2\frac{3}{8}$; depth (contracted), about $3\frac{1}{2}$; D. 11, 6; A. 11, 6; P. 1, 14; head width, $1\frac{1}{2}$ in its length; snout, $1\frac{1}{2}$; eye, $4\frac{3}{4}$; interorbital, $2\frac{1}{4}$. Body cylindrical, robust; belly loose, though skin tough or moderately pliable and capable of great inflation. Caudal peduncle depressed so least depth equals its width at same point. Head large, robust, broad as deep when not inflated, upper profile little inclined in front. Snout convex over surface and in profile, about wide as long. Eye moderate, ellipsoid, front edge about midway in head. Mouth rather large. Teeth large, with entire even cutting edges. Lips thick, fleshy, and greatly papillose. Nostrils together, on front and hind faces of short fleshy knob, which is nearly an eye-diameter in advance of eye, nearly level with upper edge. Interorbital broad, with wide shallow median concavity. Gill-opening nearly vertical, equals $1\frac{1}{2}$ eye-diameters. Skin entirely smooth, with very fine longitudinal wrinkles on back and sides behind pectoral to dorsal and on inflatable belly. Dorsal inserted nearly at last third between front eye edge and caudal base. Anal similar, inserted entirely but close

¹ Cat. Fish Brit. Mus., vol. 8, 1870, p. 258.

behind dorsal. Caudal with hind edge slightly concave. Pectoral broad, upper rays forming slight point above and rounded lobe below, larger than dorsal. Color in alcohol uniform brown above, under surface same general tint except paler. Iris pale olive-brown. Dark blotch over each eye on interorbital edge. Fins dull brownish. Length, 248 mm.

The above interesting example appears identical with *Tetrodon cutaneus* Günther.¹ Its distribution so far to the northward as the Azores is likely due to the influence of the Guinea Current. In Günther's short description few other than minor variants appear, so that I am unable to separate the Azores fish from the South Atlantic.

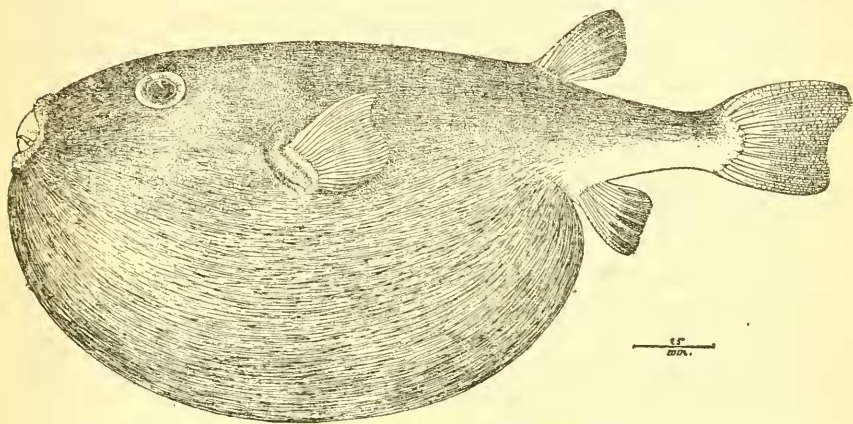


FIG. 3.—*LIOSACCUS CUTANEUS* (GÜNTHER).

2. PORTO GRANDE ON ST. VINCENT, CAPE DE VERDE ISLANDS.

The Cape de Verde Islands partake largely of the African ichthyofauna, and, lying along the route of European exploration and discovery of the West African region, are associated with its development. As Goree Island, off the Senegal, was the first point on the African coast from which any attempt was made to gather representative collections of fishes, one finds the first enumeration of Cape de Verde fishes, with those from the Gabun, also included in Duméril's memoir "Poissons Afrique Occidentale."² Brito-Capello gives a list of the fishes obtained in the various Portuguese possessions,³ among them a number from the Cape de Verde Islands. Other localities are Angola, Madeira, St. Thomé, Baissau, and Mozambique. Pereira-Guimaraes, in the papers already referred to under the Azores collection, also mentions species from the Cape de Verde Islands. Günther has a short list in his *Challenger* shore fishes from St. Vincent

¹ Cat. Fish. Brit. Mus., 1870, p. 287.

² Arch. Mus. Hist. Nat., vol. 9, 1858, pp. 241-268, pls. 20-23.

³ Jorn. Sci. Lisboa, 1871, pp. 194-202, 208 307; 1872, p. 83.

and St. Jago,¹ and Clark lists those obtained by the *Scotia*.² Detailed accounts and figures of a Goree collection are given by Steindachner.³

SARDINELLA AURITA (Valenciennes).

Two examples.

MURAENA MELANOTIS (Kaup).

Head, 8; depth, $12\frac{1}{2}$; combined head and trunk shorter than rest of body by space between eye and gill-opening; snout, 6 in head measured from upper jaw tip; interorbital, $7\frac{1}{4}$; upper jaw to rictus, $2\frac{1}{2}$; eye, $2\frac{2}{3}$ in snout, $2\frac{1}{2}$ in interorbital. Snout length, about $1\frac{1}{4}$ its width. Lower jaw well protruded. Teeth uniserial, strongly compressed, entire. Two fang-like teeth in front above, hind one larger. Nostrils in short tubes of about equal length, three in eye, posterior slightly before eye. Anal edge inconspicuously and narrowly pale brown. General color dark chocolate brown with largely uniform appearance. Length, 1,373 mm.

This example does not show the short dark vertical lines forming squares on front part of body above, as indicated in Kaup's figure of *Limamuraena melanotis*,⁴ though the characteristic black rictal blotch and much larger one embracing the gill-opening quite conspicuous. The tail and trunk also show traces of obscure dark blotches or spots, and along dorsal fin several distinct blackish blotches. *Muraena clepsydra* Jordan and Evermann differs in color and has a much shorter lower jaw, the black rictal blotch with white blotch immediately forward and anal edge not pale.

GYMNOTHORAX FUNEBRIS (Ranzani).

One example, 950 mm. Edge of anal very narrowly pale. Compared with an example from Santo Domingo, West Indies, it largely agrees, except in its more olive-brown tinge. Bloch's figure of *G. afer*⁵ shows a moray with well blotched or deeper dark markings and is closely related to *Muraena moringua* Cuvier, as contended by Jordan and Davis.⁶

ABLENNES HIANIS (Valenciennes).

One 760 mm. (jaws damaged). Compared with a slightly smaller example from St. Christopher's Island, West Indies, which measures 384 mm. (beak broken), the scales are different, due to age. In the West Indian fish the circuli are all more or less united, and with the median narrow vertical area always more or less bridged, at least above and below. In the Cape de Verde example they are always

¹ Rep. Voy. *Challenger*, Zool., vol. 1, 1880, p. 3.

² Scottish Nat. Ant. Exp. Zool., vol. 4, Fishes, 1915, pp. 382-384.

³ Denk. Ak. Wiss. Wien, vol. 45, 1882, pp. 1-15, pls. 1-6.

⁴ Abhand. Naturw. Verein Hamburg, vol. 4, 1859 (1860), p. 27, pl. 4.

⁵ Nat. Aust. Fisch., vol. 9, 1795, p. 85, pl. 417.

⁶ Rep. U. S. Fish Comm., 1888 (1892), p. 603.

separate at basal and apical areas, evidently a condition of age. Both have the same fin formula, though the West Indian fish agrees with Jordan and Evermann's Hawaiian¹ in the slightly shorter pectoral, though at present without any traces of the four dark spots on the back below dorsal as shown in the figure. They mention but three blotches as sometimes present. Steindachner notes an example from Acapulco Bay, Mexico, 738 mm. long, but dark dorsal spots are not mentioned.²

SELAR CRUMENOPHTHALMUS (Bloch).

Head, 3; depth, $3\frac{1}{4}$ to $3\frac{1}{2}$; D. VIII—I, 25; A. II—I, 22; scales, 50 to 51 — 40 to 41 in lateral line; snout, $3\frac{1}{3}$ to $3\frac{1}{2}$ in head, measured from snout tip; eye, $2\frac{2}{3}$ to 3; maxillary, $2\frac{1}{8}$ to $2\frac{1}{6}$; interorbital, $4\frac{1}{8}$ to $4\frac{1}{4}$; rakers 11 to 13 + 27 or 28, lanceolate, long as filaments, or 2 in eye. Two examples, 223 and 254 mm.

A comparison of scales and other characters, as gill-rakers, radii, scutes, etc., reveals no distinctions other than individual, in examples from the Philippines and Hawaiian Islands. The circuli on the scales are very fine and mostly continuous where approximating.

CEPHALOPHOLIS TAENIOPS (Valenciennes).

Head, $2\frac{2}{3}$; depth, $3\frac{1}{3}$; D. IX, 15, 1; A. III, 9, 1; scales, 107 along and above lateral line to caudal base, and 8 more on latter; 70 pores in lateral line to caudal base and 4 more on latter; 13 scales above lateral line to soft dorsal origin, 26 below to spinous anal origin; snout $3\frac{2}{3}$ in head, measured from upper jaw tip; eye, 6; maxillary, about $2\frac{1}{8}$; interorbital, $5\frac{1}{4}$. Body well compressed, elongate, also caudal peduncle. Head compressed, flattened sides slightly approximate above, and upper profile little concave above nostrils. Snout slightly broader than long. Eye high, well advanced or center near first third in head. Mouth large, lower jaw well protruded. Maxillary to hind pupil edge, expansion $1\frac{7}{8}$ in eye. Teeth in rather wide bands, pair of canines above and double pair below in front. Lower teeth mostly larger, in three or four rows, graduated to inner row which longest, and all but outer row depressible inwards. Patch of large inner depressible teeth each side in front of upper jaw. Sides of upper jaw with outer row of slightly larger erect teeth, and inner row of villiform ones. Vomer and palatines each with row of minute or villiform teeth. Tongue pointed, free. Interorbital broadly convex. Hind preopercle edge minutely and obsoletely denticulate, but very slightly enlarged at angle, which rounded. Rakers IV, 4 + 11 VI, lanceolate, slightly longer than filaments, or $1\frac{2}{3}$ in eye. Scales small,

¹ Bull. U. S. Fish Comm., vol. 23, pt. 1, 1903, p. 125, fig. 40.

² Sitz, Ak. Wiss. Wien., vol. 72, abth. 1, 1875, p. 64.

crowded, mostly ctenoid, those on head cycloid. Snout scaly, and only very few obsolete maxillary scales. Dorsal origin about opposite pectoral origin, third spine longest or slightly over one-third of head. Soft dorsal inserted little nearer caudal base than hind preopercle edge; fin rounded. Spinous anal inserted about midway between pectoral origin and caudal base, third spine longest or about $3\frac{1}{2}$ in head. Soft anal, like soft dorsal. Caudal rounded. Pectoral broad, rounded, $\frac{3}{4}$ to anal. Ventral origin slightly behind pectoral origin, not quite reaching far back as pectoral tips or to vent, which about an eye-diameter before anal.

Color in alcohol dark brown everywhere except lower or ventral edge with small blue dark-edged spots. On lower side spots more sparse and less crowded than on back and vertical fins. Pectoral also spotted, though ventrals plain brown, but both pairs with dusky edges. Vertical rayed fins narrowly edged bluish. Brown line from near snout tip to eye above, includes nostrils. Another below extends along snout side horizontally till close under eye. Length, 344 mm.

DIAGRAMELLA MACROPS (Pellegrin).

Head, $3\frac{1}{4}$ to $3\frac{1}{2}$; depth, $2\frac{7}{8}$ to 3; D. XIII, 15; A. III, 7; scales 100 to 108 along and above lateral line to caudal base, and 15 to 17 more or less enlarged on latter; tubes, 56 to 58 in lateral line to caudal base and about 10 more on latter; 12 scales above lateral line to soft dorsal origin and 18 or 19 below to spinous anal origin; snout, 3 to $3\frac{1}{8}$ in head; eye, $3\frac{2}{3}$ to 4; maxillary, $2\frac{1}{2}$ to $2\frac{3}{5}$; interorbital, $3\frac{1}{4}$ to 4.

Body elongately ellipsoid, well compressed. Caudal peduncle strongly compressed, least depth $1\frac{1}{4}$ to $1\frac{1}{3}$ its length, or about $2\frac{2}{3}$ in head. Head deep, well compressed; width, 2 to $2\frac{1}{8}$ its length. Snout convex, long as wide or little shorter. Eye large, advanced or hind pupil edge about midway in head length. Mouth moderate, jaws about even. Maxillary beyond front eye edge, not quite to pupil, expansion 2 in eye. Teeth small, in bands in jaws, and outer row enlarged, especially forward. No teeth on roof of mouth or tongue, latter elongate, rounded and free in front. Nostrils large, close together, front one about half an eye-diameter before front eye edge. Interorbital convex. Hind preopercle edge with about 25 to 30 denticles, small and obsolete below. Gill-opening forward about opposite hind maxillary end. Rakers 14+20, lanceolate, about long as filaments or two in eye. Pseudobranchiae slightly shorter than filaments. Scales all finely ctenoid, in oblique series above and below lateral line, smaller about body edges and on head. Snout to nostrils and area around same, maxillary and also most of mandible, naked. Suprascapula densely scaled, hind edge dentate. Cheek with 21 or 22 rows of scales. Pectoral with short concealed axillary scaly flap. Bases of all fins scaly, and caudal largely covered with very minute

scales. Spinous dorsal without scales, and edges of soft dorsal and anal broadly naked. Scales with very fine circuli, mostly waved, and basal radii 5 to 11. Lateral line complete, largely concurrent with dorsal profile, and tubes simple. Spinous dorsal inserted about opposite ventral origin, fifth spine longest or $2\frac{1}{4}$ in head with others graduated down, and edge entire. Soft dorsal origin little nearer spinous dorsal origin than caudal base, rays about equally high or first ray about 3 in head. Anal spines with fine longitudinal striae, second larger and little longer than third or 2 to $2\frac{1}{6}$ in head, fin origin nearly midway between ventral origin and caudal base. Soft anal rounded, first branched ray longest or $1\frac{4}{5}$ to $1\frac{7}{8}$ in head. Caudal deeply emarginate, much less so as fully expanded, fin $1\frac{1}{3}$ to $1\frac{1}{6}$ in head. Pectoral, $1\frac{1}{4}$ in head; ventral, $1\frac{2}{3}$ to $1\frac{1}{2}$ and spine, $1\frac{1}{2}$ to $1\frac{2}{3}$ in fin. Vent about an eye-diameter before anal.

Color in alcohol with general appearance uniform brownish, each scale with pale yellowish median small spot. Fins all pale brownish; edges of dorsals and anal narrowly dusky-brown. Iris brownish. Length, 301 and 302 mm., two examples.

Pellegrin gives the coloration¹ as violet above, also the fins, and lower surfaces orange-yellow. His figure differs from both my examples in showing the second dorsal spine but little less than the third, my examples having it only about half the third. The scales are also not shown on the preorbital, which in my specimens are in about a dozen rows across the narrowest part.

Diagramella Pellegrin² is here admitted to generic rank, allied with *Plectorhinchus* Lacépède (= the later *Diagramma* Olsen), in its rather numerous gill-rakers, broad preorbital and rather deep body. It differs in the oblique mouth, rather more dorsal spines (13 compared with 9 to 12) and less elevated head. *Anomalodon* Bowdich³ is allied with *Parapristipoma* Bleeker in its long anal fin. Bowdich, however, gives a crude figure of his *Pristipoma humilis*⁴ and, though the scales are represented as far too large for the present species, still certain details are somewhat suggestive. He says "the forehead of this species has but little elevation," D. XIII, 14; A. II (one very short) and 8 rays; "the fins and tail are a pale yellow, the rest of the fish is silvery." Now the serrate preopercular edge, maxillary, large eye, emarginate caudal and dark marginal lines of the dorsals and soft anal, shown on the figure also invite consideration.

Pristipoma viridense Cuvier⁵ is described briefly as uniform brown, second anal spine slightly longer than third, with 12 dorsal and 8 anal rays. Valenciennes next states⁶ it has 14 dorsal and 7

¹ Annal. L'Inst. Océanog. Prince de Monaco, vol. 6, fasc. 4, 1914, p. 48.

² Bull. Soc. Zool. France, vol. 37, 1912, pp. 292, 295.

³ Excurs. Madeira, 1825, p. 237.

⁴ Idem., p. 236, pl. fig. 40.

⁵ Hist. Nat. Pois., vol. 5, 1830, p. 215. San-Iago, ile du cap Vert.

⁶ Hist. Nat. Iles Canar., Ichthyol., 1836-44, p. 26.

anal rays, the scales 60, and the large second anal ray striate. The latter gives its color as uniform brown with a blue-black spot on each scale, fins blackish and deeper on soft parts, pectoral paler, ventrals yellowish basally and blackish at tips. Günther gives ¹ the dorsal rays 15 and the anal 7, and the lateral line 80, also color uniform brown with dorsal edge more or less distinctly blackish. As these writers place it in *Pristipoma*, the inference is it possesses the central groove below the chin, not found in the above examples.

PAGELLUS MORMYRUS (Linnaeus).

Head, $2\frac{3}{4}$ to $3\frac{1}{10}$; depth, $2\frac{3}{8}$ to $2\frac{5}{8}$; D. XI or XII, 11, 1 or 12, 1; A. III, 10, 1; scales 58 to 60 in lateral line to caudal base and 6 to 8 more on latter; 5 scales above lateral line to soft dorsal origin, 12 below to spinous anal; snout, $2\frac{1}{8}$ to $2\frac{1}{2}$; eye, $4\frac{1}{8}$ to 5; maxillary, $2\frac{3}{8}$ to 3; interorbital, $3\frac{3}{4}$ to $3\frac{7}{8}$. Upper molars in 4 rows and row next to innermost of largest size. Lower molars in 3 rows in front, but median row becomes inner behind, where of larger size. Checks with five rows of scales. Trunk with seven narrow brownish cross bars on sides. Three examples, 134 to 219 mm.; one from Loando (p. 284).

Compared with the largest example one from Messina, Italy, of about the same size, shows a longer snout, or eye about $2\frac{3}{4}$ in snout, compared with $2\frac{1}{8}$ or less in the Cape de Verde material. The Messina example with maxillary not reaching much beyond front nostril, while in the Cape de Verde reaching hind nostril. The former with 10+16 rakers and between each dark vertical bar on the back another midway, but fainter and not extending as far below. Scales of all with 9 or 10 basal striae.

LETHRINUS ATLANTICUS Valenciennes.

Head, $2\frac{1}{8}$; depth, $2\frac{5}{8}$; D. X, 9, 1; A. III, 7, 1; P. II, 11; scales 45 in lateral line to caudal base, 5 above to soft dorsal origin, and 14 below to spinous anal origin; 9 predorsal scales; snout, $1\frac{7}{8}$ in head; eye, $4\frac{1}{2}$; maxillary, $2\frac{3}{8}$; interorbital, $4\frac{1}{8}$. Body deep, well compressed, back moderately elevated. Caudal peduncle well compressed, least depth $1\frac{1}{2}$ its length, or $3\frac{1}{8}$ in head. Head pointed, well compressed, width $2\frac{1}{8}$ its length, sides flattened, upper profile slightly concave near snout end and above eye. Eye rounded, elevated, front edge about midway in head length. Mouth large, nearly horizontal, jaws about even. Lips thick, tough, moderately wide. Bands of villiform teeth in jaws, with outer row strongly conic formed as pair of canines in front of each jaw, nine molar behind. No teeth on mouth roof. Maxillary to front nostril, which slightly over half of eye length before and nearly level with lower eye edge. Hind nostril larger above and nearer eye. Interorbital broadly convex. Preopercle

¹ Cat. Fish Brit. Mus., vol. 1, 1859, p. 302. Madeira and St. Vincent.

edge entire. Rakers 5 + 7 short knobs, $2\frac{3}{5}$ in filaments, and latter $1\frac{5}{6}$ in eye. Pseudobranchiae nearly large as gill-filaments. Scales large, in rows parallel with lateral line. Patch of scales above preopercle, few in postocular region, though opercles scaly, head otherwise naked. Smaller scales on breast and base of caudal than on trunk. Cheek marked by broad area of fine vertical reticulations, all below eye. Suprascapula entire. Scales minutely ciliated and basal striae about 10. Lateral line largely concurrent with back, tubes large and simple. Spinous dorsal inserted about over pectoral origin, fourth spine (damaged) longest, all spines rather robust. Soft dorsal inserted little nearer caudal base than hind preopercle edge, fin rounded, sixth ray $2\frac{3}{5}$ in head. Spinous anal inserted little nearer pectoral origin than caudal base, third or longest spine $3\frac{3}{5}$ in head, and rayed fin like soft dorsal. Caudal little emarginate, upper lobe $1\frac{2}{5}$ in head. Pectoral about $\frac{3}{4}$ to anal, pointed, upper rays longest, $1\frac{2}{5}$ in head. Ventral inserted just behind pectoral base, extends as far back, spine about three-fifths of fin, which $1\frac{3}{4}$ in head. Vent about half an eye-diameter before anal. Color in alcohol largely dull uniform brownish, back darker or more olivaceous. Fins all plain pale brownish. Length, 368 mm.

PSEUDUPENEUS PRAYENSIS (Cuvier).

Head, $3\frac{1}{4}$ to $3\frac{1}{3}$; depth, $3\frac{3}{5}$; D. VIII—I, 8; A. I, 5 or 6; scales, 28 or 29 in lateral line to caudal base, and 3 more on latter; 3 scales above lateral line and 6 below; 7 predorsal scales to occiput; snout, $1\frac{7}{8}$ to $1\frac{9}{10}$ in head; eye, 5 to $5\frac{1}{8}$; maxillary, $2\frac{3}{5}$ to $2\frac{3}{4}$; interorbital, $3\frac{7}{8}$ to 4. Upper teeth biserial. Three outer teeth each side little enlarged and flaring out somewhat backward. No teeth on mouth roof. Cheek with three rows of scales. Scales finely ciliated and with about five basal striae. Two examples, 203 to 209 mm.

The pale spots shown in Bleeker's figure are not now very evident.

BALISTES FORCIPATUS Gmelin.

Head, 3; depth, 2; D. III—III, 26; A. II, 23; P. I, 12; scales, 61 from gill-opening to caudal base and 7 more on latter; 33 scales from rictus to pectoral origin; snout, $1\frac{3}{4}$ in head; eye, 6; interorbital, $3\frac{7}{8}$. Body well compressed, contour ellipsoid. Caudal peduncle and head compressed, profiles slightly concave in front. Preorbital groove about four-fifths of eye. Mouth small, with thick fleshy lips. Median pair of teeth largest and all teeth distinctly notched. Nostrils together, about two-fifths of eye-diameter before eye close over preorbital groove. Interorbital convex. Gill-opening little inclined, equals two-fifths of eye. Scales all roughened, asperities usually in vertical series. Front of first dorsal spine asperous, fins otherwise smooth. Ventral spine rough, followed by 10 narrow thin

spines in flap. Humeral region asperous. First dorsal spine inserted over gill-opening, $1\frac{3}{5}$ in head, second about one-third of first, and third still shorter. Soft dorsal origin about midway between hind nostril and caudal base, elevated front lobe with first five branched rays elongate filaments, with first three at least reaching slightly beyond caudal base. Anal like second dorsal, except front lobe without elongated rays. Caudal with upper and lower rays protruded in points, hind edge of fin convex medially. Least depth of caudal peduncle $4\frac{1}{3}$ in head, rounded pectoral $2\frac{3}{4}$.

Color in alcohol brownish generally, paler below. Back with many thickset deep brown round spots, which on flanks and lower surface give place to larger spots of darker color than narrow pale ground-color formed as reticulating lines. Also center of each lower spot with pale spot. Sides of head and trunk with traces of irregular pale bluish dots or small spots. Dorsal and anal spotted darker, especially second dorsal, though paler spots more numerous on anal. Length, 441 mm.

SCORPAENA SENEGALENSIS Steindachner.

Head, $2\frac{1}{4}$; depth, 3; D. XII, 9; A. III, 5; P. I, 6, XI; V. I, 5; scales from shoulder opposite upper corner of gill-opening, along and above lateral line to caudal base, 45, and 4 more out on latter; tubes, 20 in lateral line to caudal base; 6 scales above lateral line to soft dorsal origin and 13 below to spinous anal origin; 6 predorsal scales; head, width $1\frac{5}{8}$ its length measured from upper jaw tip; snout, $3\frac{2}{5}$; eye, $6\frac{2}{5}$; maxillary, $2\frac{1}{4}$; interorbital, $5\frac{2}{5}$; third dorsal spine, $2\frac{3}{4}$; fourth dorsal ray, $2\frac{2}{5}$; second anal spine, 3; first anal ray, $2\frac{2}{5}$; least depth of caudal peduncle, $4\frac{1}{3}$; caudal, $1\frac{2}{5}$; pectoral, $1\frac{1}{2}$; ventral, $1\frac{1}{4}$.

Body elongate, back greatly elevated in front with greatest depth at base of second dorsal spine. Caudal peduncle well compressed, and length about two-thirds its least depth.

Head very large, compressed; sides convex and slightly converging above. Snout large, broadly convex over surface and in profile, length about two-thirds its width. Eye moderate, ellipsoid, hind edge advanced little before center in head length. Maxillary oblique, extends opposite hind pupil edge, expansion but slightly less than eye length. Mouth large, wide, and closed mandible but slightly protruding. Bands of villiform teeth in jaws, but not extending across front of either, on palatines and vomer. Lower inner buccal fold narrower than upper. Tongue large, fleshy, wide, free around front edge, surface smooth. Front nostril nearer eye than snout tip, just below frontal spine, with fringed tentacle above nearly high as latter. Hind nostril with similar tentacle, on inner front face of preorbital. Interorbital not quite wide as orbital socket, deeply concave, though bottom more or less leveled. Occiput with deep

cavity nearly wide as interorbital. Deep pit nearly large as pupil below lower eye front.

A pair of frontal spines, conic and sharp pointed. Front of each supraorbital with broad strong spine. Pair of supraorbital spines posteriorly, and lower or second larger. Pair of spines at front of occipital depression, widely separated, and from each hind corner of depression row of four spines extend back, last about opposite base of first dorsal spine. Close below on opercle above two large spines. Pair of small close-set postocular spines close behind each eye. Opercle with two large spines, lower slightly little posterior. Suborbital bony stay with two small spines directed forward, then larger one directed down over most of maxillary width, and finally with four more spines of which first two directed down and others directed backward. Preopercle edge with four spines, uppermost with short prong, and lower broader and more forward.

Gill-opening forward about opposite second nostril. Rakers, III 2+6 IV, robust, rather clavate, short, spinescent, not quite long as filaments, which $1\frac{1}{2}$ in eye. Pseudobranchiae about four-fifths of gill-filaments. Isthmus broad, with narrow fleshy elongate-triangular exposed area.

Scales large, in oblique rows on trunk, cycloid, elongate, with very fine incomplete parallel circuli and basal striae about 26 to 34. Smaller scales on caudal base, also on belly, and still smaller on breast and prepectoral region. Head largely covered with rather large though inconspicuous scales. Preocular tentacle about equals vertical diameter of pupil, and supraocular tentacle much larger or about $1\frac{1}{2}$ in horizontal eye-diameter. Series of tentacles around snout border, large one in front and another from below and behind, enlarged lower spine at front of suborbital stay, mandible and maxillary with small skinny flaps, and row across cheek below suborbital stay. Others about hind preopercle edge, within interorbital, on preorbital, etc. Skinny flap from hind edge of each scale in lateral line, and many others from scales on sides of trunk, though rather well scattered. Lateral line concurrent with dorsal profile from shoulder to caudal base, not on latter, and tubes all simple and well exposed.

Spinous dorsal inserted little before base of uppermost pectoral ray, spines robust, edge deeply notched but without skinny flaps; third spine longest, last $1\frac{1}{2}$ in third, and first shortest. Soft dorsal inserted nearly midway between hind edge of gill-opening and caudal base; fourth ray longest, fin edge notched and reaches back to caudal base. Spinous anal inserted nearly opposite last dorsal spine base, third spine slightly less than second, and first about half of second. Soft anal much higher than soft dorsal, short base slightly less than half height of fin, which rounded and reaches back about opposite

caudal base. Caudal rounded convexly behind. Pectoral large, very broad, extends back but little short of anal, and large thickened lower rays nearly forward to hind preopercle edge. Ventral origin nearly opposite second dorsal spine base. Fin about $\frac{7}{8}$ to anal, and spine nearly $\frac{3}{4}$ of fin. Vent before anal space equal to orbital socket.

Color in alcohol rich brownish generally, variegated with darker to blackish or dusky-brown, or whitish, fading quite pale and with very obscure mottlings on belly and under surface. Head similar, only lower surface more mottled or streaked with whitish. Preorbital region and cheek below with more or less blackish. Fins all brownish, variegated with handsome waved darker bands or streaks. Uppermost portion of each membrane of spinous dorsal dusky, three large dark crossbands on caudal, and about same on pectoral. Ventral and anal paler than dorsal, former more so on inner surface and outer with few obscure or pale brown spots. Iris pale brown, speckled or blotched with darker, and upper half of eye like wrinkled cutaneous curtain.

Length, 295 mm. Cat. No. 42175, U.S.N.M.

The fine example described above agrees quite closely with Steindachner's figures, though they do not show the large blackish blotch below the suborbital stay and another smaller one in the axil just above pectoral base.

The present species is apparently allied with *Scorpaena ustulata* Lowe, of which I have no examples for comparison. However, Bellotti's figure ¹ agrees with an Italian example of *Scorpaena scrofa* Linnaeus in the apparently less developed armature of the head, weaker dorsal and anal spines, maxillary extending slightly behind eye edge, and soft dorsal with 10 branched rays. Bellotti also shows an antero-orbital tentacle above and another larger, broader one at same point but still higher, and a dark submarginal blotch between eighth to tenth dorsal spines. In the Italian example noted, which is about the same size as *S. senegalensis*, the latter has a larger and prominent antero-orbital spine, eye $1\frac{1}{2}$ in snout compared with $1\frac{3}{4}$ and the scales very different. In the Italian example the scales are rather less rounded in general contour, and the basal striae much fewer and confined within the limits of the corners of each scale, not spread out like a well-opened fan. Collett figures an example of *S. ustulata* ² which differs in many ways, a few of which are its lack of tentacles or skinny flaps, very different armature, indication of scales on head only on postocular and below hind part of suborbital stay, hind caudal edge but little convex, greatly longer first anal spine, no preorbital pit, coloration, etc. Compared with *Scorpaena plumieri* Bloch, represented by two examples from Santo

¹ Atti. Soc. Ital. Sci. Nat. Milano, vol. 31, 1888, p. 213, pl. 4, fig. 1.

² Res. Camp. Sci. Prince de Monaco, vol. 10, 1896, p. 10, pl. 4, fig. 15.

Domingo, West Indies, and of but little smaller size, the axilla differs in being jet black with a few pure white spots, and rest of inner pectoral surface uniform or at least without dark markings. The basal striae on the scales of *S. plumieri* are also a little coarser, as seen under a lens.

3. ASCENSION ISLAND.

Situated in the middle of the South Atlantic, this volcanic island was early visited by Osbeck,¹ he listing nine species, several afterwards utilized by Linnaeus. Not until over a century later was further material examined, when Gunther reported on the small lot obtained by the *Challenger*,² and then noting three more species the following year.³

As a few species obtained by the Eclipse expedition are doubtfully credited to St. Helena Island, it may be useful to note the few faunal works relative to that island. Gunther⁴ gives two lists of the collections obtained by Melliss, who also published an interesting general work on the island, including a popular account of its fishes.⁵ This is compiled largely from Günther's papers. More recently Cunningham⁶ and Clark,⁷ the latter in his *Scotia* report, give interesting detailed accounts. Unless otherwise stated, all the material listed under the present caption refers to Ascension Island.

BELONE TRACHURA Valenciennes.

Head, $3\frac{1}{8}$ to $3\frac{1}{2}$; depth, $1\frac{1}{8}$ to $1\frac{1}{2}$ in postocular part of head; D. II, 12; A. II, 17; predorsal scales about 110 to 118; eye, $1\frac{3}{8}$ to $1\frac{3}{4}$ in postocular region; interorbital $1\frac{3}{8}$ to $1\frac{7}{8}$; least width of caudal peduncle, $2\frac{1}{2}$; rakers II, 2 + 6 x or x1; two examples, 339 to 347 mm.

These agree in every way with those from the Azores, except that the lower caudal lobe appears slightly longer than the upper.

ABUDEFDUF ASCENSIONIS, new species.

Head, $3\frac{1}{8}$; depth, $1\frac{3}{4}$; D. XIII, 13; A. II, 13; P. I, 17; V. I, 5; scales, about 26 in lateral series from shoulder to caudal base medially, and 8 more larger ones on latter; tubes, 20 in lateral line; 5 scales above lateral line to soft dorsal origin and 11 below to spinous anal origin; head, width $1\frac{7}{8}$ its length; snout, $3\frac{3}{8}$; eye, 4; maxillary, $3\frac{7}{8}$; interorbital, $3\frac{1}{2}$; fifth dorsal spine, 2; fourth dorsal ray, $1\frac{1}{4}$; second anal spine, 2; fourth anal ray, $1\frac{1}{4}$; least depth of caudal peduncle, $1\frac{1}{2}$; caudal, $1 + \frac{1}{8}$; pectoral, $1 + \frac{1}{8}$; ventral, $1\frac{1}{10}$.

¹ Reise Ost.-Ind. China, 1765, pp. 385-396.

² Rep. Voy. *Challenger*, Zool., vol. 1, 1880, p. 5.

³ Ann. Mag. Nat. London, ser. 5, vol. 8, 1881, pp. 430-440.

⁴ Proc. Zool. Soc. London, 1868, pp. 225-228; 1869, pp. 238-239.

⁵ St. Helena (London), 1875, Fishes, pp. 100-113, pls. 19-21.

⁶ Proc. Zool. Soc. London, 1910, pp. 86-130, pls. 1-3.

⁷ Scottish Nat. Ant. Exp. Zool., vol. 4, Fishes, 1915, pp. 387-393.

Body deeply ovoid, well compressed, back much elevated, though predorsal scarcely trenchant. Caudal well compressed; depth, two-thirds its length.

Head large, deep, greatly compressed, flattened sides but slightly converging below. Snout convex, length two-thirds its width. Eye rounded, but slightly elevated, advanced, with hind edge about midway in head length. Mouth small, with short gape, and lower jaw but very slightly protruding. Lips moderately wide. Maxillary to nostrils and expansion about half of eye. Teeth uniserial, incisor like, and end of each with slight notch. Tongue pointed and free in front. Nostril simple pore, nearly opposite eye center or

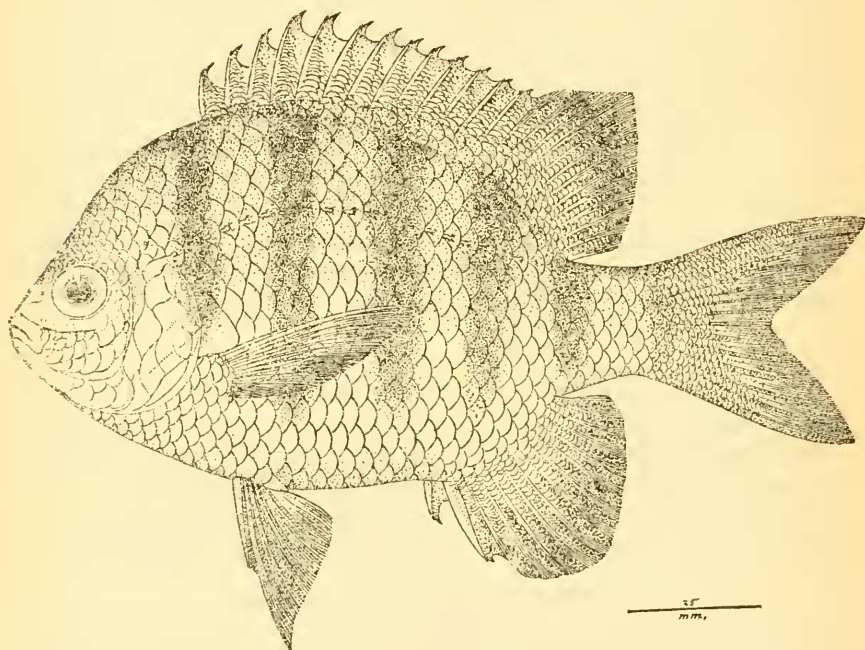


FIG. 4.—*ABUDEFDUF ASCENSIONIS*.

about last third in snout. Interorbital convex. Infraorbital width little less than vertical pupil diameter, edge entire; also hind preopercle edge.

Gill-opening forward about opposite nostril. Rakers about 7 + 18, lanceolate, but slightly shorter than filaments, which $1\frac{1}{4}$ in eye. Pseudobranchiae nearly long as gill-filaments. Isthmus narrow, rather slender.

Scales large, finely ciliated, smaller along body edges, and become quite crowded and minute on fin bases. Humeral scale enlarged and suprascapula entire. Pointed scaly axillary ventral flap about 3 in fin. Cheek with four rows of scales. Each scale with about

8 to 10 basal striae. Lateral line concurrent with dorsal profile only extends until about midway in soft dorsal base. Tubes simple, well exposed.

Spinous dorsal origin slightly behind pectoral origin; after fifth spine subequal edge notched. Soft dorsal origin about last third between suprascapula origin and caudal base, fourth ray longest with others graduated down, extends back slightly beyond caudal base. Spinous anal origin about midway between pectoral origin and caudal base, first spine slightly less than half length of second. Soft anal lower than soft dorsal; fourth ray longest; fin about reaching caudal base. Caudal deeply forked, pointed lobes similar. Pectoral long, not quite to anal origin, upper rays longest. Ventral inserted behind pectoral base, fin nearly to anal origin, and spine about half its length. Vent close before anal.

Color in alcohol largely dull brownish olive, paler below. Back and sides with 5 dark-brown broad vertical cross-bands, darker above lateral line. Fins all brownish, dorsal without distinct reflections of dark vertical bars on back, and outer portions of soft dorsal, anal, and ventral dusky or dark brown. Axial of pectoral dark brown. Iris brownish. Length 165 mm.

Type.—Cat. No. 42315, U.S.N.M. Ascension Island. Wm. Harvey Brown. U. S. Eclipse Expedition to W. Africa, 1889.

Also another example, paratype, same data; paratypes 42,314 two examples, same data; 42,316, four examples, Ascension Island or Saint Helena. These show: head 3 to $3\frac{1}{2}$; depth $1\frac{3}{4}$ to $1\frac{5}{8}$; D. XIII, 13; A. II, 13; tubes in lateral line 20 or 21, with 9 or 10 scales counted on to caudal base; 4 or 5 scales above lateral line to soft dorsal origin and 11 or 12 below to spinous anal origin; snout $3\frac{2}{5}$ to $3\frac{4}{5}$ in head; eye $3\frac{1}{2}$ to 4; maxillary 3 to $3\frac{3}{5}$; interorbital $2\frac{7}{8}$ to $3\frac{1}{2}$; rakers 6 or 7 + 18 or 19; length 69 to 135 mm.

Compared with a series of examples of *Abudefduf marginatus* (Bloch) from the Bahamas, St. Martins, West Indies, Florida, and Panama, the present species differs in the outer portion of soft dorsal dusky, dark transverse band on caudal peduncle reflected as dusky band across soft dorsal basally and the presence of 13 anal rays. The West Indian species has a shorter or slightly more rounded or orbicular contour and 12 anal rays.

(For the Ascension Islands.)

THALASSOMA ASCENSIONIS (Quoy and Gaimard).

Head 3 to $3\frac{2}{5}$; depth $3\frac{1}{2}$ to $3\frac{1}{2}$; D. VIII, 14; A. III, 12; P. I, 14; V. I, 5; scales 27 in lateral line to caudal base and 1 more on latter; 3 scales above lateral line to soft dorsal origin, 9 below to spinous anal origin; 8 predorsal scales; snout $2\frac{1}{2}$ to $3\frac{2}{5}$ in head; eye $4\frac{2}{5}$ to $6\frac{1}{8}$; maxillary $3\frac{3}{5}$ to $6\frac{1}{8}$; interorbital $4\frac{1}{4}$ to $4\frac{1}{2}$.

Body strongly compressed, elongate. Caudal peduncle deep, compressed, length about three-fifths its width. Head greatly compressed, width $2\frac{2}{3}$ its length. Eye small, round, elevated; hind edge slightly advanced in head length. Maxillary about two-thirds to eye, not quite to front nostril. Lips rather fleshy. Teeth conic, even in front of jaws, slightly curved, uniserial, pair of canines in front of each jaw. Nostrils small pores, hind one level with upper eye edge and close to its front edge. Interorbital convex. Rakers about $6+9$ short points, one-fourth of filaments; latter nearly long as eye. Pseudobranchiae about three-fourths of filaments. Head naked. Scales reticulate medially, basal striae 23 to 47 and apical striae 11 to 24. Scales on breast smaller than sides, still more so on predorsal and caudal base. Lateral line complete, high on back at first, drops midway on caudal peduncle and tubes simple to four-branched. Spinous dorsal inserted slightly before pectoral origin, slightly behind in young, last spine longest or $3\frac{2}{3}$ to $4\frac{1}{3}$ in head. Soft dorsal inserted about opposite depressed pectoral tip, fifth ray $2\frac{1}{3}$ to $2\frac{1}{2}$ in head. Anal inserted little behind soft dorsal origin, third or largest spine, $4\frac{1}{2}$ to $4\frac{3}{4}$ in head; first anal ray, $2\frac{2}{3}$ to 3. Least depth of caudal peduncle $1\frac{7}{8}$ to $2\frac{1}{5}$. Caudal emarginate behind, corners pointed, $1\frac{1}{8}$ to $1\frac{1}{3}$ in head. Caudal rounded convexly behind in young. Pectoral $1\frac{1}{2}$ to $1\frac{3}{5}$ in head; ventral $1\frac{1}{3}$ to $3\frac{1}{2}$ and inserted little behind pectoral. Ventral nearer anal.

Color in alcohol generally brown; lower surface paler. Each scale with dark median and basal vertical line so whole trunk appears evenly and finely cross-barred. Membranes between first three dorsal spines black. Also small black spot at pectoral origin. Dorsals and anals each with lengthwise brown band medially entire length of fins, otherwise pale brownish. Caudal pale yellowish, edges above and below, also base, deep brown. Pectoral and ventral darker at ends, general color brown. Iris pale brown. Young without dark vertical lines very distinct, though broad longitudinal dark band, from snout tip to caudal base medially, conspicuous. Length, 79 to 153 mm., three examples. Ascension Island or St. Helena.

The smallest of the above is doubtless identical with *Julis ascensionis* Quoy and Gaimard,¹ based on an example 90 mm. long. Their figure shows the red band through the eye much narrower than over the costal region, and a dark line transversely at pectoral base, whereas in my example the small spot at the fin origin is characteristic as in the larger examples. Quoy and Gaimard also figure a scale showing but 11 basal and as many apical striae, which is a lower number than I find for basal striae. The adult is next described as *Julis sanctae-helenae* Valenciennes.² Though Günther only

¹ Voy. *Astrolabe*, vol. 3, 1835 (March 17), p. 706, pl. 20, fig. 5. L'île de Ascension.

² Hist. Nat. Poiss., vol. 13, 1839, p. 280. Sainte Hélène.

notes¹ each scale has a darker center, Valenciennes carefully mentions in detail the fine dark vertical lines. Melliss has a very crude colored figure² which does not show the dark spot at the front of the spinous dorsal or the pectoral origin. Finally, Günther gives a note on the change of color with age, in Ascension examples.³

CHAETODON SANCTAE-HELENAE Günther.

Head, 4; depth, $1\frac{3}{4}$; D. XIII, 21; A. III, 19; P. II, 13; V. I, 5; scales, 52 from shoulder to caudal base medially and about 8 more on latter; tubes, 36 in lateral line; 10 or 11 scales above lateral line

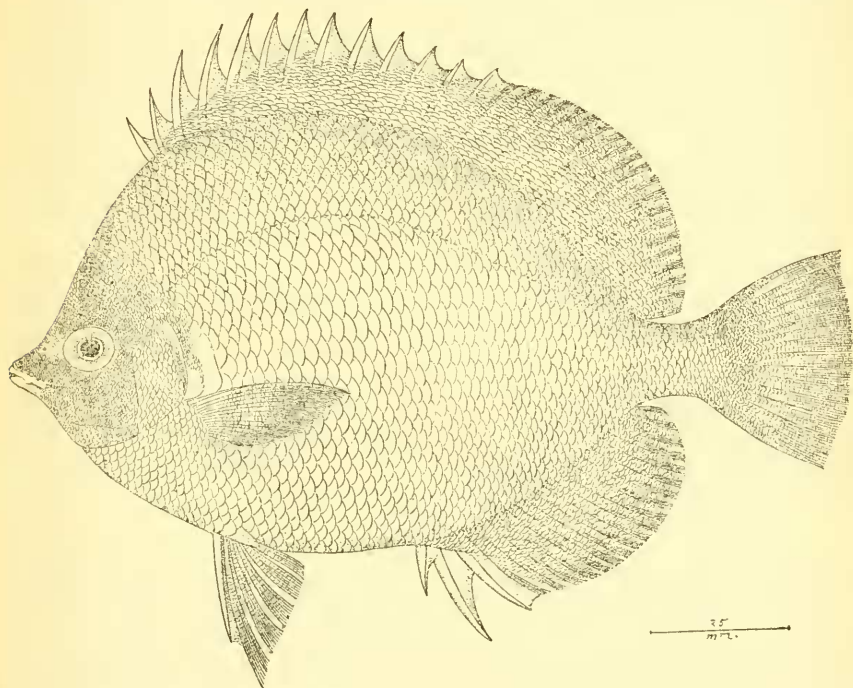


FIG. 5.—CHAETODON SANCTAE-HELENAE GÜNTHER.

to spinous dorsal origin, 23 or 24 below to spinous anal origin; head width, 2 in its length; snout, $3\frac{2}{5}$; eye, $3\frac{3}{5}$; maxillary $3\frac{1}{4}$; interorbital, 3.

Body orbicular, strongly compressed. Caudal peduncle well compressed; length about three-fourths its least depth. Head deep, upper profile more concave than lower. Snout conic, about long as wide. Eye rounded; advanced, hind pupil edge about midway in head length. Mouth small; lower jaw slightly protruding. Lips rather thin. Teeth in brush-like bands, though lower much firmer or as if welded into firm cutting edge. Maxillary small, largely concealed

¹ Cat. Fish. Brit. Mus., vol. 4, 1862, p. 191.

² Rep. Voy. Challenger, Zool., vol. 1, 1880, p. 5.

³ St. Helena, 1875, p. 109, pl. 21, fig. 2.

by preorbital, expansion about $3\frac{1}{3}$ in eye, nearly to hind nostril. Nostrils together, close before eye. Interorbital convex. Preopercle edge entire, with slight emargination at corner. Rakers, 4 + 16 short points, about one-fourth of filaments; latter $2\frac{1}{3}$ in eye. Scales largest on middle of side, become very small on head and vertical fins, finely ciliated, largest with about 12 basal striae. Courses of scales slightly oblique upward behind, rows converging smaller toward caudal peduncle and forward toward head. Pointed ventral axillary scaly flap nearly two-fifths of fin. Lateral line largely concurrent with profile of depressed dorsals; tubes largely simple. Spinous dorsal begins little before pectoral origin, fifth spine longest or two-thirds of head, fin edge deeply notched. Soft dorsal inserted little nearer caudal base than head. Spinous anal inserted trifle before soft dorsal origin, nearly midway between hind eye edge and caudal base, second spine longest, or about $1\frac{1}{3}$ in head. Soft anal like soft dorsal. Caudal but very slightly less than head, truncate, convex behind when expanded. Pectoral about long as caudal, and ventral but very slightly shorter; spine $1\frac{1}{3}$ in head. Vent close before anal.

Color in alcohol largely dull uniform brown, back slightly darker. Each scale with small pale basal spot. Obscure broad dull brown band from predorsal just before spinous dorsal, wide as pupil, down over cheek but not below latter. No trace of other markings. Edges of soft vertical fins narrowly dusky. Ventral tinged brownish on outer portions. Soft dorsal, anal, and caudal all pale yellowish-brown, with pale shade across front of caudal peduncle. Iris pale brown. Length, 138 to 147 mm., two examples.

POMACANTHUS PARU (Bloch).

Head, $3\frac{1}{2}$; depth, $1\frac{2}{5}$; D. X, 29; A. III, 23; pores in lateral line, 50 (?) to caudal base; snout, $2\frac{1}{6}$ in head from upper jaw tip; eye, $3\frac{2}{5}$; maxillary, $3\frac{1}{8}$; preopercle spine, $4\frac{1}{8}$; interorbital, $2\frac{2}{3}$; least depth of caudal peduncle, $1\frac{1}{8}$ in entire head length; caudal, $1\frac{2}{5}$ pectoral, $1\frac{1}{8}$; ventral spine, $2\frac{1}{16}$; rakers, 4 + 12. General color blackish, with numerous large scales of back and sides edged narrowly as whitish crescent. These crescents gradually shorter and more dotlike as they progress out on vertical fins. Scales of head, breast, predorsal, and abdomen uniformly dark. Whitish band from front nostril to eye, and extends along lower edge as very narrow whitish border. Lower lip pale, chin and mandible whitish. Ventral blackish. Length, 240 mm.

This species is apparently not known from Ascension Island previously, and unfortunately no material is at hand for comparison. Two examples of the allied *Pomacanthus arcuatus* (Linnaeus) from Key West, Florida, 203 and 210 mm. long, differ in the distinctions claimed

by Jordan and Evermann.¹ The Key West examples do not show any pale bar from the nostril to the eye, or pale narrow border below the eye, their soft dorsals and anals are narrowly edged with whitish behind, caudal broadly white, pectoral uniform blackish basally and in surrounding region, all scales broadly edged whitish or gray on trunk and dorsal and anal bases; also many white spots extend forward even until well before pectoral; nostril much further advanced before eye and lower or about level with lower eye edge, and lips prominently dusky. A point in agreement is the pale chin. A larger dried example of *P. arcuatus* from Nassau, Bahamas, 408 mm. long, now appears uniformly brownish-black, but in its large scales and lowered nostrils, which about three-quarters an eye-diameter before eye agrees with the Key West examples. No difference is apparent in the general scale structure, the apical spinules of about similar extent, and the basal striae vary 7 or 8 in both species.

BALISTES VETULA Linnaeus.

Head, 3; depth, $1\frac{1}{2}$; D. III—III, 28; A. II, 25; P. I, 13; scales 58 from gill-opening to caudal base and 5 more on latter; 30 scales from rictus to pectoral origin; snout, $1\frac{1}{2}$ in head; eye, $5\frac{1}{2}$; interorbital, 4; first dorsal spine, $1\frac{2}{3}$; second branched dorsal ray, $1\frac{1}{2}$; least depth of caudal peduncle, $4\frac{1}{4}$; pectoral, $2\frac{3}{4}$.

Body well compressed, contour ellipsoid. Caudal peduncle and head compressed, lower profile of latter slightly more convex than upper. Preorbital groove about long as eye. Mouth small, terminal, with thick fleshy lips. All teeth slightly notched, median pair in each jaw largest. Nostrils together, about two-fifths of eye diameter before eye close over preorbital groove. Interorbital convex. Gill-opening little inclined, long as space between front nostril and hind eye edge. Scales all asperous, mostly with regular <-shaped row of close-set asperities along front of each. Front of first dorsal spine asperous; fins otherwise smooth. Ventral spine finely roughened, and about 18 narrow thin spines in flap. Humeral region spinose, like surrounding scales. First dorsal spine inserted over large humeral scales close behind gill-opening. Second dorsal spine slightly less than half of first and third, little shorter than second. Second dorsal origin about midway between hind nostril and caudal base, pointed front lobe reaching caudal base. Anal like second dorsal but with shorter point in front. Caudal deep, upper and lower points produced, concave; hind edge slightly convex when expanded. Pectoral rounded.

Color in alcohol brownish generally, little paler on head below. Pale bluish streak from near snout tip until close below pectoral base.

¹ Bull. U. S. Nat. Mus., No. 47, vol. 2, 1898, p. 1680.

Another from snout tip, around lips, then from along upper lip, parallel with upper streak, and ends shortly before its bend. Just below nostril dark line toward eye below, and then continued as pale blue line to pectoral origin. Another dark line above nostril to eye and two others behind transversely over interorbital. Also dark line from hind eye edge toward dorsal spine, but not reaching base of latter. In front of it on short predorsal two other short dark bars. From lower hind eye edge two pale blue lines to humeral scales and little behind eye short oblique blue line toward second dorsal spine, and another toward anal. Dorsal, anal, and caudal each with moderate pale blue submarginal band; fins otherwise brown. Pectoral brown, outer portions paler. Also pale blue band at caudal base and broader one across caudal peduncle. Iris pale brown, narrow brown circle around pupil. Length, 266 mm. to caudal base; 378 mm. to end of caudal filaments.

The example already noted from the Azores agrees in every way, except as due to age, in the much longer caudal filaments and the presence of two dorsal filaments from front of soft dorsal.

Compared with a dried example 385 mm. long to caudal base from St. Christopher's Island, West Indies, the latter varies in 26 branched dorsal rays and about 61 scales from gill-opening to caudal base. The two large blue bands over the cheek are like those in my Ascension and Azores examples, the upper not touching the pectoral base or showing a broad triangular area below the same. The St. Christopher's fish has the upper band double the width of the lower and approaching nearer the pectoral origin or upper pectoral base than indicated in Nichols and Murphy's figure of their *Balistes vetula trinitatis*.¹ All of my examples have a deeper or less slender muzzle, and the lower profile a little more convex than upper. A small example from St. Croix, West Indies, 180 mm. to caudal base, shows the upper band but little broader than the lower and approaching near lower part of caudal base. Its soft dorsal with 27 branched rays and scales 60.

MELICHTHYS PICENS (Poey).

Head, $3\frac{2}{3}$; depth, 2; D. III—II, 31; A. II, 28; P. I, 15; scales, 60 from gill-opening to caudal base and 6 more on latter; 21 scales from rictus to pectoral origin; snout, $1\frac{1}{3}$ in head; eye, 5; interorbital, $2\frac{3}{4}$; first dorsal spine, $1\frac{3}{8}$; second branched dorsal ray, $1\frac{1}{2}$; least depth of caudal peduncle, $2\frac{7}{8}$; pectoral, $2\frac{1}{4}$.

Body well compressed, upper profile more evenly convex than lower, which bulging more in front. Caudal peduncle and head compressed, profiles alike. Preorbital groove about long as eye. Mouth

¹ Bull. Amer. Mus. Nat. Hist. N. Y., vol. 33, 1914, p. 255, fig. 3. South Trinidad Island.

See also Copeia, Jan. 24, 1917, No. 39, p. 1. Ascension Island. Also April 15, 1918, No. 56, p. 47.

small; lips moderately fleshy. Median teeth largest, edges of all entire or truncate. Nostrils together, about half an eye-diameter before eye, well above preorbital groove. Interorbital convex. Gill-opening little inclined, $1\frac{1}{3}$ in eye. Scales roughly striate, and striae mostly horizontal. Front of first dorsal spine finely roughened, also most of pectoral and caudal bases and caudal rays. Ventral spine coarsely rough, not followed by spines but simply rough edges of scales. Humeral region finely asperous. First dorsal spine inserted over gill-opening, second spine about two-fifths of first and short third one concealed in groove of fin. Second dorsal origin about midway between front nostril and hind tip of last dorsal ray, and front branched rays highest, but not forming lobe. Anal like second dorsal. Caudal concave behind, fin $1\frac{1}{4}$ in head. Pectoral rounded.

Color in alcohol uniform deep blackish-brown, with chocolate tint. Bases of dorsal and anal each with narrow white line. Caudal with transverse submarginal line behind its outer edge bordered with narrow pale or whitish line. On head above many blue-black lines extend from one eye to other and in front along preorbital groove well down on snout. Others also unite and extend forward from nostrils. Teeth and iris pale. Length, 318 mm.

The synonymy of this species has been greatly complicated. It is evidently the species intended as *Balistes niger* Osbeck, as cited by Linnaeus under his *Balistes ringens*.¹ Osbeck's name is next published in similar fashion by Forster,² so Bloch is then the first to propose *B. niger* in available form,³ but is antedated for a different fish by the *B. niger* of Mungo Park.⁴ *B. ringens* Linnaeus is said by Bleeker⁵ to be a species near *Balistes chrysospilus* Bleeker. Bloch's figure is quite crude and does not show the striking narrow whitish lines along the dorsal and anal bases, as so well represented in Lacépède's figure and subsequent ones.

ALUTERA SCRIPTA (Osbeck).

Head, 3 to $3\frac{1}{8}$; depth, $2\frac{3}{8}$ to $2\frac{1}{2}$; D. 46 or 47; A. 47 to 49; eye, $5\frac{2}{3}$ to $5\frac{4}{5}$ in head; interorbital, $4\frac{1}{8}$ to $4\frac{2}{3}$. Three examples, 330 to 418 mm. Variably spotted with dusky or brownish-black and most spots concentrate around eye. Many leaden spots, streaks, or blotches distributed between dark spots.

¹ Syst. Nat., ed. 10, 1758, p. 329. Ad ins. Ascensionis.

² Voy. China Osbeck, vol. 2, 1771, p. 93. Ascension Island.

³ Nat. Ausl. Fisch., vol. 2, 1786, p. 27, pl. 152. Chineschen Gewässern.

⁴ Trans. Linn. Soc. London, vol. 3, 1797, p. 37. Sumatra.

⁵ Atlas Ich., vol. 5, 1863, p. 108.

LEPTECHENEIS NAUCRATES (Linnaeus).

Head, $5\frac{1}{4}$; depth, $8\frac{1}{2}$; laminae, 23; D. IV, 35; A. III, 36; snout, $2\frac{1}{10}$ in head from upper jaw tip; eye, $6\frac{3}{4}$; maxillary, 3; interorbital, $1\frac{3}{8}$; pectoral, $1\frac{1}{4}$ in entire head length; ventral, $1\frac{2}{5}$; disk, $4\frac{1}{4}$ in body; rakers, 1 + 11. Dark brown band through eye equals eye width, then expands to basal pectoral width, to become lighter along side to caudal base. Length, 610 mm.

Local New Jersey examples usually show 21 or 22 laminae and rakers 3 + 10 to 14.

BLENNIUS ATLANTICUS (Valenciennes).

Head, $4\frac{1}{3}$; depth, $4\frac{4}{5}$; D. XI, 23; A. I, 23; head width, about 2 in its length; snout, $2\frac{1}{5}$; eye, $3\frac{2}{3}$; maxillary, $2\frac{2}{5}$; interorbital, 2 in eye. Body well compressed, deepest about middle of pectoral. Caudal peduncle well compressed, least depth 3 in head. Head short, deep, steep front profile but little inclined from vertical. Eye high, within bulge and close to upper profile. Mouth inferior, broad, lower jaw shorter. Maxillary to eye center. Lips wide. Row of fine pectinate teeth in each jaw, very numerous and uniform. Lower jaw only with long slender canine each side. Interorbital shallowly convex. Rakers 30 and simple on outer side of first arch, 20 and many bifid or trifid on inner side of first arch, longest barely $\frac{1}{4}$ of filaments, which about half of eye. Supraorbital tentacle long as vertical eye-diameter and front nasal tentacle little less. Small short tentacle each side of occiput. Dorsal slightly notched at soft dorsal origin, third spine about $1\frac{1}{3}$ in head, third ray $1\frac{2}{5}$ and last ray joined to front of caudal above. Anal begins much nearer snout tip than caudal base, fourth ray $1\frac{1}{4}$ in head and last ray free. Caudal with lower rays longest, rounded behind, fin $1 + \frac{1}{8}$ in head, pectoral $1\frac{1}{10}$, ventral $1\frac{1}{3}$. Color in alcohol brown, dusky to blackish, largely uniform, and belly slightly duller brown. Iris whitish. Fins all blackish, except upper caudal edge broadly whitish and edge of soft dorsal pale brown. Length, 100 mm. Ascension Island or St. Helena.

Apparently agrees with an example, 68 mm. long, from Colon, Panama, though it has D. XI, 20 and A. I, 21. *Alticus macclurei* Silvester¹ from Porto Rico is the half-grown stage, not showing any structural characters worthy of separation.

ALTICUS TEXTILIS (Valenciennes).

Head, $3\frac{5}{8}$ to 4; depth $4\frac{2}{5}$ to $5\frac{1}{4}$; D. XI or XII, 14 or 15; A. I, 15 or 16; head width, $1\frac{1}{2}$ to $1\frac{3}{5}$ in its length; snout, 3 to $3\frac{1}{2}$; eye, $4\frac{1}{4}$ to 5; maxillary, 2 to $2\frac{1}{6}$; interorbital, $1\frac{1}{2}$ in eye. Body well compressed, deepest

¹ Papers Marine Biol. Carnegie Inst., Wash., vol. 12, 1918, p. 24, pl. 3, fig. 2.

about midway in pectoral. Least depth of caudal peduncle, $2\frac{7}{8}$ to $3\frac{1}{8}$ in head. Head oblong, front profile rather convex, well inclined. Eye high, within bulge and close to upper profile. Mouth inferior, broad, lower jaw shorter. Maxillary to hind eye edge. Lips wide. Row of fine pectinate teeth in each jaw, very numerous and uniform. Lower jaw only with long slender canine each side. Interorbital shallowly convex. Rakers about 14 weak points one-third of filaments and latter $1\frac{1}{2}$ in eye. Supraorbital tentacle about two-thirds of eye and front nasal tentacle about half as long. Dorsals nearly separated, first spine, $2\frac{1}{4}$ in head; third dorsal ray, $1\frac{7}{8}$; third anal ray, $2\frac{1}{4}$; caudal, $1\frac{5}{8}$; pectoral, 1; ventral, $1\frac{3}{4}$. Color brownish generally with about 14 rather obscure vertical brownish bands which have row of several whitish dots, usually about three with median about midway in body depth. Several brownish spots on side of head. Two large black blotches, first smaller and embraces pectoral origin, edges of both whitish. Dark bars on trunk reflected

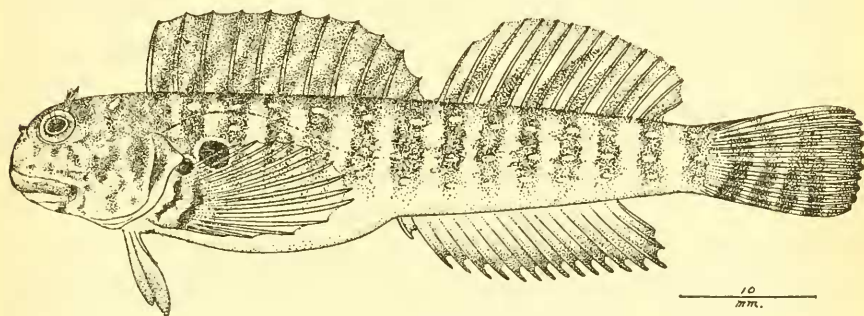


FIG. 6.—*ALTICUS TEXTILIS* (VALENCIENNES).

on dorsals obliquely up backward. Caudal with four dark transverse bands. Anal brownish, edge dusky. Pectoral pale brown, with broad deep brown basal band and another parallel on prepectoral. Iris whitish. Two examples, 63 to 65 mm.

4. FREETOWN, SIERRA LEONE.

No faunal papers have appeared and the species described from the colony are mostly scattered through the works of Günther and Boulenger. The fresh-water fauna is little known. The marine fauna may be understood in conjunction with the extensive papers by Pellegrin and ¹Steindachner ² relative to the Senegal region, and Klapotcz ³ relative to French Guinea. Pellegrin also described

¹ Bull. Soc. Zool., France, 1905, pp. 135-141; 1907, pp. 83-89; 1911, pp. 182-186; 1913, pp. 116-118.—Actes Soc. Linn. Bordeaux, 1903, pp. 15-57, pl. 3; 1907, pp. 71-103. — Annals L'Inst. Océanogr., Prince de Monaco, vol. 6, fasc. 4, 1914, pp. 1-100, pls. 1-2.

² Sitz. Ak. Wiss. Wien, vol. 60 (1), 1869, pp. 669-715, 945-996; vol. 61 (1), 1870, pp. 533-583. *

³ Zool. Jahrbuch. Syst., 1913, pp. 279-290.

new species from the last-named region.¹ Papers relative to Liberia are mentioned further on.

ALBULA VULPES (Linnaeus).

Head, $3\frac{3}{5}$ to $3\frac{3}{4}$; depth, $4\frac{2}{5}$ to 5; D. III, 14, 1; A. III, 6, 1; scales 68 to 71 in lateral line to caudal base and 6 more on latter; 9 scales above lateral line, 6 below; 27 or 28 predorsal; snout, $2\frac{2}{5}$ to $2\frac{1}{2}$ in head; eye, $4\frac{3}{5}$ to $4\frac{4}{5}$; maxillary, $2\frac{4}{5}$ to $3\frac{1}{10}$; interorbital, $2\frac{7}{8}$ to 3; rakers, 9 or 10 + 10. Two examples. 324 to 329 mm. Compared with Atlantic specimens from Panama the scales are indistinguishable.

ETHMALOSA DORSALIS (Valenciennes).

Two examples.

GALEICHTHYS LATISCUTATUS (Günther).

Two examples, 241 and 281 mm. The larger example differs in the adipose fin about half size of smaller example. Rakers, 4 + 9. Maxillary barbel extends but very little beyond pectoral origin, outer mental barbel three-fourths of space to same. Depressed dorsal $1\frac{3}{4}$ to adipose fin. Upper caudal lobe longer.

The smaller example has the adipose fin $2\frac{1}{2}$ in head. Rakers, 5 + 8. Depressed dorsal 3 to adipose fin. In both the patches of vomerine-pterygoid teeth resemble those figured by Günther² under *Arius parkii* rather than as indicated by Boulenger.³

SERIOLA FASCIATA (Bloch).

Head, $2\frac{7}{8}$ to 3; depth, $2\frac{3}{5}$ to 3; D. VII or VIII—I, 29 to 32; A. II—I, 18 to 21; snout, 3 to $3\frac{2}{5}$ in head; eye, $3\frac{7}{8}$ to $4\frac{1}{8}$; maxillary, $2\frac{1}{5}$ to $2\frac{4}{5}$; interorbital, 3 to $3\frac{2}{5}$.

Body fusiform, well compressed, deepest at soft dorsal origin. Head width, 2 to $2\frac{1}{5}$ in its length. Snout convex, about long as wide. Eye rather large, advanced, hind edge about midway in head length. Mouth large, jaws about even. Maxillary to pupil, expansion $1\frac{2}{3}$ to 2 in eye. Teeth in villiform bands in jaws, on vomer and palatines. Nostrils together, midway in snout. Interorbital convex, with median keel to spinous dorsal. Rakers about 6 + 15, lanceolate, long as filaments and latter $1\frac{3}{4}$ in eye. Scales minute, cycloid, with 4 to 8 basal striae and circuli rather coarse. Cheek with row of 12 to 14 scales. Lateral line well arched, curve $1\frac{1}{3}$ to $1\frac{2}{5}$ in straight portion. Spinous dorsal inserted little behind pectoral origin; fourth spine, 4 to $4\frac{4}{5}$ in head. Soft dorsal inserted midway between snout tip and caudal base; first branched ray, $1\frac{7}{8}$ to 2 in head. Anal like soft dorsal, only shorter; neither fin lobate in front and first branched ray $2\frac{3}{5}$ to 3 in head. Caudal well forked, $1\frac{1}{5}$ in head; pectoral, $1\frac{1}{5}$ to $1\frac{7}{8}$; ventral, $1\frac{1}{3}$ to $1\frac{2}{5}$.

¹ Bull. Soc. Zool., France, 1913, pp. 236-241.

² Cat. Fish. Brit. Mus., vol. 5, 1864, p. 155.

³ Cat. Fresh-Water Fish. Africa, vol. 1, 1911, p. 385, fig. 297.

Color in alcohol brown above, paler below. Back with six pairs of close-set obscure deeper brown cross bars. Broad brown band from upper hind eye edge to spinous dorsal. Dorsals dusky or blackish-brown, paler basally on soft fin and edge broadly contrasted in young. Apex of soft dorsal pale or whitish. Anal pale brown with broad marginal dark band. Ventral blackish; rays and lower surfaces whitish. Pectoral and caudal brownish. Thirteen examples, 98 to 120 mm. All obtained at sea, in latitude $6^{\circ} 38' N.$; longitude $13^{\circ} 40' W.$

Bloch's figure of his *Scomber fasciatus*,¹ though very crude in its transverse bands, shows unmistakable characters in the short round pectoral, dark band from upper hind eye edge toward occiput, etc.

CARANX AFRICANUS Steindachner.

Head, $3\frac{2}{5}$ to $3\frac{3}{5}$; depth, $2\frac{1}{2}$ to $2\frac{3}{4}$; D. VII-II, 20 or 21; A. II-II, 17 or 18; scutes in lateral line, 42 to 45; snout, $3\frac{2}{5}$ to $3\frac{3}{5}$ in head from upper jaw tip; eye, $3\frac{3}{4}$ to $3\frac{3}{4}$; maxillary, $2\frac{1}{2}$ to $2\frac{3}{5}$; interorbital, $3\frac{1}{4}$ to $3\frac{3}{5}$; rakers, 12 + 28 to 30; two examples, 323 and 334 mm. In the larger example the long dorsal lobe is $1\frac{3}{5}$ in fin base.

PSEUDOTOLITHUS BRACHYGNATHUS Bleeker.

Head, $3\frac{1}{2}$; depth, $3\frac{2}{3}$ to $3\frac{5}{6}$; D, X, 1, 26 or 27; A. II, 7, 1; tubes, 50 or 51 in lateral line to caudal base; 6 scales above lateral line to soft dorsal origin and 7 below to spinous anal origin; 17 predorsal scales to head; snout, $4\frac{1}{4}$ to $4\frac{1}{3}$ in head from upper jaw tip; eye, 5 to $5\frac{3}{4}$; maxillary, $2\frac{1}{4}$; interorbital, 6 to $6\frac{1}{5}$. Elongate, well compressed, back moderately elevated, deepest at spinous dorsal base medially. Caudal peduncle strongly compressed; least depth, 1 to $1\frac{1}{5}$ its length, or $3\frac{1}{4}$ to $3\frac{2}{5}$ in total head length. Head width, $2\frac{2}{5}$ to $2\frac{1}{2}$ its length. Snout, convex; length two-thirds to three-fourths its width. Eye little ellipsoid; hind edge advanced about half an eye-diameter beyond center in head length. Mouth large, lower jaw protruding. Teeth biserial, upper with outer row of well-spaced canines and inner row of small uniform close-set conic teeth; lower teeth reversed. Front above with two moderate inclined canines set little inside. Maxillary to hind pupil edge, expansion largely concealed, about seven-eighths of eye. Interorbital convex. Few uneven denticles along hind preopercle edge largely concealed. Rakers, 11, 3 or 4 + 9, v, lanceolate, equal filaments or $1\frac{1}{5}$ in eye. Scales large, narrowly imbricated, finely ciliated, in oblique rows above and below lateral line, which become horizontal below lateral line after anal and above after soft dorsal. Scales with 20 or 21 basal radii, circuli often complete and as very fine vermiculations medially. Supracapula entire. Row of small scales on soft dorsal base, and caudal

¹ Nat. Ausl. Fisch., vol. 7, 1793, p. 73, pl. 341. Vaterland unbekannt.

base and breast scales also small. Tubes of lateral line large, with many as 8 or 10 branches. Third dorsal spine, $1\frac{3}{4}$ to 2 in head, third ray, $2\frac{1}{5}$ to $3\frac{3}{5}$. Anal small, inserted much nearer caudal base than ventral origin; second spine, $3\frac{1}{5}$ to 4 in head. Caudal ends in long median point behind, $1\frac{1}{5}$ to $1\frac{1}{4}$ in head; pectoral, $1\frac{2}{5}$ to $1\frac{3}{5}$; ventral, $1\frac{2}{5}$ to $1\frac{1}{5}$. Vent nearly an eye-diameter before anal.

Color in alcohol brownish above, sides and below silvery-white. Iris and most of head silvery-white. Dark band extends medially along each row of scales on trunk above. Spinous dorsal with outer portions dusky. Soft dorsal paler, with two rows of longitudinal deep brown spots, pair on each membrane with upper about middle of fin and lower basal. Other fins all pale brownish. Two examples, 322 to 354 mm.

JOHNIUS NIGRITUS (Cuvier).

Head, $3\frac{1}{4}$ to $3\frac{1}{5}$; depth, $3\frac{1}{4}$ to $3\frac{3}{5}$; D. X, I, 32 or 33; A. II, 6; tubes, 50 in lateral line to caudal base; 7 scales above lateral line to soft dorsal origin and 8 below to spinous anal origin; 32 predorsal scales to head; snout, $4\frac{1}{5}$ in head from upper jaw tip; eye, 4 to $4\frac{1}{5}$; maxillary, 2; interorbital, 4 to $4\frac{1}{5}$. Elongately ovoid, well compressed, deepest at spinous dorsal base medially. Caudal peduncle strongly compressed, long as deep or least depth 4 to $4\frac{1}{4}$ in head. Head width, $2\frac{1}{5}$ to $2\frac{1}{4}$ its length. Snout convex; length, $\frac{3}{4}$ its width. Eye slightly ellipsoid, advanced, hind edge about one-third of eye-diameter before center in head length. Mouth large; lower jaw very slightly projecting. Teeth simple, conic, in narrow bands in jaws, outer row of upper slightly enlarged or caninelike, lower reversed, though upper also with few inner slightly enlarged teeth in front. Maxillary to hind pupil edge; expansion, $1\frac{2}{5}$ to $1\frac{3}{5}$ in eye. Interorbital convex. Several inconspicuous or largely hidden serrae at preopercle corner. Rakers, II 7 to 9+13 II to V, lanceolate, longer than filaments, or $1\frac{3}{4}$ in eye. Scales narrowly imbricated, greatly crowded at predorsal, in oblique rows above and below lateral line; after anal below and largely above also parallel. Scales with 10 to 17 basal striae, circuli very fine and often complete, and apical denticles slender. Suprascapula with frayed cutaneous border. Row of smaller scales along soft dorsal base; also small scales on caudal base. Breast scales larger than predorsal. Tubes in lateral line large, greatly branched above and below from main vertical or oblique stem. Second dorsal spine $2\frac{1}{10}$ to $2\frac{1}{6}$ in head, third ray $2\frac{2}{5}$. Anal small, inserted much nearer caudal base than ventral origin, spines striate, second greatly enlarged and $1\frac{3}{4}$ to $2\frac{1}{5}$ in head, second ray $1\frac{1}{5}$ to 2. Caudal with long median point behind, $1\frac{1}{5}$ to $1\frac{1}{4}$ in head; pectoral, $1\frac{1}{4}$; ventral, $1\frac{1}{5}$ to $1\frac{1}{4}$.

Color in alcohol, back brown, sides and lower surface silvery-white. Each row of scales on back and upper sides with obscure median brownish streak. Iris whitish with dusky above. Fins largely pale

brownish; spinous dorsal dusky; soft dorsal with median deep brown longitudinal streak or two median parallel longitudinal streaks, and some scattered deep brown spots along base. Front part of soft anal, behind enlarged spine, dusted with deep brown. Caudal and pectoral dull brown, and ventral slightly yellowish. Two examples, 268 to 273 mm.

GALEOIDES DECACTYLUS (Bloch).

Head, $2\frac{7}{8}$ to $3\frac{1}{4}$; depth, $2\frac{5}{8}$ to $3\frac{1}{2}$; D. VIII—I, 1, 13; A. III, 11; pectoral filaments, 9; scales, 43 to 45 in lateral line to caudal base and 6 more on latter; 6 scales above lateral line, 8 or 9 below; snout, $4\frac{4}{5}$ to $5\frac{1}{2}$ in head; eye, $3\frac{1}{4}$ to $4\frac{1}{8}$; maxillary, $2\frac{3}{5}$ to $2\frac{4}{5}$; interorbital, $3\frac{1}{8}$ to $3\frac{4}{5}$; rakers, 9 to 13 + 15 to 22. Scales finely ciliated, each with two basal radii and circuli fine. Four examples, 209 to 229 mm., of which two from Ashantee (p. 258).

LAGOCEPHALUS LAEVIGATUS (Linnaeus).

Two young, from latitude $2^{\circ} 33' 22''$ S.; longitude, $23^{\circ} 57' 15''$ W

CEPHALACANTHUS VOLITANS (Linnaeus).

Seven very young, 25 to 60 mm., from same locality as the last. They are quite variable, and though the spines on the head all well developed, in largest but little shorter than head and not quite reaching far back as pectoral tip, in smallest twice length of pectoral and reaches half way to caudal base. Eye also greater than post-orbital in smallest. Compared and found to agree with other young Atlantic examples.

5. LIBERIA.

Besides the material in the United States National Museum are two small collections in the Academy of Natural Sciences of Philadelphia. The latter are of interest historically, apparently the first fishes ever collected in Liberia, and though several have been mentioned in scattered papers, the collections as a whole have never been examined and reported. The first of these comprise seven species Dr. S. M. E. Goheen gathered at Monrovia, and received at the Academy in the early forties. The other was made by the Rev. Thomas S. Savage at Cape Palmas, and donated to the Academy in 1847. The National Museum material includes the fishes obtained by O. F. Cook and G. N. Collins, at Mount Coffee, Monrovia, and that from the St. Pauls River at the same locality by Rolla P. Currie. In order to distinguish the various collections and their localities, the following letters indicate: G. (Goheen), S. (Savage), C. C. (Cook and Collins), and C. (Currie).

Concerning the literature several extensive papers have been contributed by Steindachner,¹ Hubrecht,² and Büttikofer.³

¹ Sitz. Ak. Wiss. Wien, vol. 55, 1837, pp. 517-526.—Notes Leyden Mus., vol. 16, 1834, pp. 1-96, pls. 1-4.

² Idem, vol. 3, 1881, pp. 61-71.

³ Reisebilder aus Liberia, vol. 2, Die Bewohner Liberia's—Thierwelt Leyden, 1890, 510 pp (Fishes pp., 447-453).

NOTOPTERUS AFER Günther. "Plank Fish."

Head, 4; depth, $4\frac{1}{3}$; D. 1, 5; A. 134 (including caudal rays); scales in lateral line, about 147 to caudal base; 20 scales above lateral line to dorsal origin, and 33 below at same point; ventral serrae, 30+5; about 100 predorsal scales to head; snout, $4\frac{2}{3}$ in head; eye, $4\frac{2}{3}$; maxillary, $2\frac{1}{2}$; interorbital, $4\frac{1}{4}$. Body deepest at dorsal origin, strongly compressed. Head width, $2\frac{1}{2}$ its length. Snout, convex; length, two-thirds its width. Eye rounded, advanced about half its diameter before head center. Mouth large; lower jaw but little shorter. Maxillary to hind pupil edge. Row of moderate conic teeth in each jaw, also on vomer and palatines. Nasal flap about one-third of eye. Interorbital broadly convex. Lower preopercle edge finely serrate. Rakers 4+8, elongately clavate, two-fifths longer than filaments or about two in eye. Scales minute, generally in rows sloping down backward, smaller on head and densely crowded over anal and caudal. About 17 rows of scales on cheek. Scales with 14 to 16 basal radii; circuli moderate and usually complete. First branched dorsal ray $2\frac{3}{5}$ in head; caudal, $3\frac{1}{3}$; pectoral, $1\frac{2}{3}$. Color in alcohol largely deep brown, marked with ill-defined irregular spots about size of pupil, though few on anal. Head below and belly little paler, soiled with deep brown. Iris slaty. Length, 155 mm. C.

CLARIAS ANGOLENSIS Steindachner.

Head, $4\frac{1}{3}$; depth, 6; D. 74; A. 52; snout, 3 in head to hind edge of gill-opening; mouth width $2\frac{1}{4}$; interorbital, $1\frac{1}{2}$; eye, 5 in interorbital. Body moderately slender; profile somewhat fusiform. Head width equals its length, nearly smooth above. Snout broad; length in profile about two-fifths its width. Eye small; center about first fourth in head. Mouth broad, lips moderate; lower jaw much shorter. Broad bands of villiform teeth in jaws and on vomer; band of latter equally wide. Nasal barbel reaches slightly beyond occipital process; maxillary slightly beyond pectoral tip; outer mental slightly beyond end of pectoral spine and inner mental about to middle of latter. Frontal fontanel sole-shaped, twice broad as long and nearly twice length of occipital. Occipital process as slight isocles triangle. Rakers, 4+12, lanceolate, about long as filaments, or $1\frac{1}{4}$ eye-diameters. Dorsal and anal not joined with caudal, but very narrowly separated. Dorsal begins at last two-fifths between pectoral and ventral origins. Body before anal shorter than rest of trunk by snout length in profile. Caudal $1\frac{2}{3}$ in head; pectoral, $1\frac{2}{3}$; ventral, $2\frac{1}{8}$. Pectoral spine serrate on both edges. Color in alcohol largely uniform brownish; belly but slightly paler. Dorsal and anal edges rather broadly and evenly whitish. Length, 98 mm. G.

The admission of this species to the Liberian fauna rests on the above determination, which was made with a comparison of Angola examples of equal size.

CLARIAS SALAE Hubrecht.

Head, 6 to $6\frac{1}{2}$; depth, 7 to $10\frac{1}{3}$; D. 80 to 92; A. 70 to 79; snout, $2\frac{3}{5}$ to $2\frac{4}{5}$ in head to hind edge of gill-opening; mouth width, 2 to $2\frac{2}{5}$; interorbital, $1\frac{7}{10}$ to 2; eye, 6 to $8\frac{3}{4}$ in interorbital. Body slender, uniformly deep. Head, width $1\frac{1}{3}$ its length, above smooth, slightly granulate in half-grown. Snout broad; length about half its width. Eye very small, about first third in head. Mouth broad, with thick papillose lips; lower jaw shorter. Broad bands of villiform teeth in jaws and on vomer; band of latter slightly broader. Nasal barbel, seven-eighths to gill-opening above, or reaches it in half-grown; maxillary to pectoral tip, outer mental two-thirds of pectoral spine, and inner mental four-fifths to pectoral origin or reaching same in half-grown. Frontal fontanel sole-shaped, twice wide as long and nearly twice length of occipital fontanel. Both fontanels much smaller with age. Occipital process broad, short, scarcely beyond bony lateral processes of head. Rakers, 4+14, lanceolate, very slightly shorter than filaments, which about twice eye-diameter. Dorsal and anal joined slightly with membrane to caudal edge. Dorsal begins about last third between pectoral and ventral origins, or midway in half-grown. Body before anal one-third rest of trunk; $1\frac{1}{2}$ in half-grown. Caudal, $1\frac{1}{3}$ to $1\frac{1}{2}$ in head; pectoral, $1\frac{1}{2}$ to 2; ventral, $2\frac{1}{2}$ to $2\frac{4}{5}$. Pectoral spine serrate on each edge in half-grown; smooth with age. Uniform umber-brown above in alcohol, paler below and first all more or less dusky. Half-grown with about 17 transverse rows of small brown obscure spots on back and lower surface much paler. Length, 231 to 417 mm.; four examples. C.

CHRYSICHTHYS NIGRODIGITATUS (Lacépède).

Head, $3\frac{1}{4}$; depth, $4\frac{3}{4}$; D. I, 6; A. IV, 8, I; snout, $2\frac{2}{5}$ in head; eye, $4\frac{1}{5}$; maxillary, 3; interorbital, $3\frac{1}{5}$. Body rather robust, compressed. Head width about $1\frac{2}{5}$ its length. Snout, length about two-thirds its width, rather narrowed forward. Eye elevated, midway in head length. Mouth large, transverse, lower jaw much shorter. Lips thick, fleshy, papillose inside. Teeth villiform, in broad continuous bands in jaws. Elongate band of villiform vomero-pterygoid teeth, not continuous across roof of mouth. Nasal barbel about three-fifths of eye; maxillary barbel reaches back to dorsal origin; outer mental barbel to pectoral origin and inner mental two-thirds as far as outer mental. Interorbital slightly concave. Rakers, 10+16 lanceolate or nearly three-fifths of eye. Fins large; dorsal rounded or with first 3 rays longest; depressed fin, $\frac{5}{6}$ to adipose fin. Adipose fin $2\frac{1}{4}$ in head; dorsal spine, $1\frac{1}{2}$; pectoral spine, $1\frac{2}{3}$, and inner edge of

last with about 14 antrorse serrae. Caudal large; lobes rather wide, deeply forked. Color in alcohol dull brown above; under surfaces all pale to whitish. Fins brownish. Iris slaty. One example 130 mm. long. C.

MALAPTERURUS ELECTRICUS (Gmelin).

Two examples from Mount Coffee. C.

MORMYROPS DELICIOSUS (Leach). "Dog-fish."

Head, $3\frac{3}{5}$; depth, $5\frac{2}{5}$; D. II, 24, I, 1; A. II, 42; scales 80 in lateral line to caudal base and 3 more on latter; 10 scales above lateral line to dorsal origin, 11 below to anal origin; 83 predorsal scales; snout $4\frac{2}{3}$ in head; mouth width 6; interorbital, $5\frac{3}{4}$. Elongate, well compressed, deepest at anal origin. Caudal peduncle small, well compressed, least depth $1\frac{3}{4}$ its length, or about $6\frac{1}{2}$ in head. Head conic, compressed; width 3 in its length. Snout convex, long as wide. Eye center near first fourth in head, 2 in snout. Mouth with short gape, broad, small, lower jaw much shorter. Teeth incisors, uniserial, ends very slightly notched medially. Interorbital convex. Scales largest in hind half of body, 14 around caudal peduncle. Scales with rather large reticulate striae, complete, about 16 basal and as many apical; also complete curculi fine. Caudal scaly over two-thirds its basal portion. Dorsal inserted slightly nearer caudal base than pectoral tip or about over first third of anal base, first branched ray about $2\frac{3}{5}$ in head. Anal inserted much nearer lower front edge of gill-opening than caudal base, first branched ray about $2\frac{2}{3}$ in head. Caudal small, well forked; lobes rather rounded, $2\frac{3}{5}$ in head; pectoral, 2; ventral, 3. Color in alcohol largely uniform deep chocolate-brown, each row of scales marked by median darker streak. Fins all dusky. Iris dull slaty. Length, 152 mm. C.

MORMYRUS GOHEENI, new species.

Head, $3\frac{2}{3}$; depth, $4\frac{1}{3}$; D. II, 58; A. III, 21; P. I, 14; V. I, 5; scales, 80 in lateral line to caudal base, and 5 more on latter; 13 scales above lateral line to dorsal origin and 12 below to anal origin; 31 predorsal scales; head width, $2\frac{2}{3}$ in its length; second branched dorsal ray, $2\frac{1}{8}$; fourth branched anal ray, $2\frac{2}{3}$; caudal, $1\frac{1}{2}$; pectoral, $1\frac{1}{3}$; ventral, $2\frac{1}{2}$; snout, $2\frac{1}{10}$ in head measured from upper jaw tip; eye, $8\frac{1}{4}$; interorbital, $6\frac{3}{5}$; least depth of caudal peduncle, $6\frac{1}{4}$.

Body elongately ovoid, with back slightly elevated; predorsal slightly trenchant and greatest depth at dorsal origin. Caudal peduncle slender, well compressed; least depth, $2\frac{2}{3}$ its length.

Head long and pointed, compressed. Muzzle tubular; least depth, $3\frac{1}{8}$ in snout, length measured from its own tip. Eye ellipsoid, rather high, its front edge about midway in head length, without lids or skin of head extending over. Lips spongy, large, and lower

as broad flap protruding in front. Teeth, 6 incisors above and 6 below, each with notched edges. Nostrils small, simple pores close together, slightly behind last third in snout length. Interorbital convex.

Gill-opening lateral, about $1\frac{1}{2}$ in snout. Rakers, 4 + 7 short rudimentary tubercles, and gill-filaments about equal eye.

Scales all narrowly imbricated, in rows sloping upward posteriorly, largest on caudal peduncle, around which 12, and closely crowded on predorsal. Caudal scaly, most scales large, edges broadly naked. Head covered with numerous pores. Scales with fine complete circuli, basal striae 24 to 27 and apical striae reticulate, incomplete medially in smaller scales. Lateral line median along side; scales small and tubes arborescent on trunk.

Dorsal inserted nearer snout tip than last anal ray base; fin slightly higher in front. Anal begins about midway in dorsal base; front branched rays highest. Caudal forked, pointed lobes about equal.

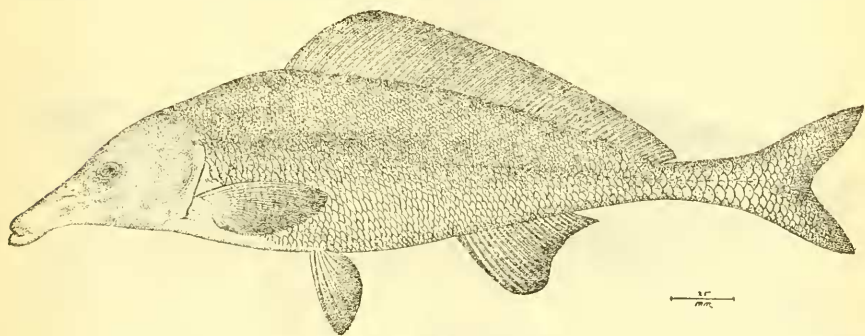


FIG. 7.—MORMYRUS GOHEENI.

Pectoral broad, extends back one-fifth in depressed ventral. Latter inserted very slightly behind dorsal origin; fin, $1\frac{2}{3}$ to anal. Vent close before anal.

Color in alcohol largely dull dusky-brown, mostly uniform. Dorsal with median longitudinal brownish band obscurely. Outer portions of caudal lobes, front of anal, and ends of paired fins with dusky to blackish tints. Iris slaty. Head, belly, and basal portion of pectoral paler than upper surfaces.

Length, 345 mm.

Type.—Cat. No. 48517, U.S.N.M. St. Paul's River, Liberia. Rolla P. Currie.

Also Cat. Nos. 48514 to 48516, and 48518, same data, paratypes. These have: head, $3\frac{3}{8}$ to $3\frac{5}{8}$; depth, 4 to $4\frac{2}{5}$; D. II, 56 to II, 59; A. II or III, 18 to 21; scales, 80 or 81 in lateral line to caudal base and 2 to 4 more on latter; 14 to 17 scales above lateral line to dorsal origin and 11 to 14 below; 32 to 36 predorsal scales; scales, 12 or 13 around

caudal peduncle; snout, $2\frac{1}{10}$ to $2\frac{1}{6}$ in head, measured from its own tip; eye, 7 to $8\frac{2}{5}$; interorbital, $5\frac{1}{3}$ to $5\frac{7}{8}$; least depth in snout length, $2\frac{3}{4}$ to $3\frac{2}{5}$; length, 295 to 334 mm.

This species is related to *Mormyrus caballus* Boulenger and *Mormyrus tapirus* Pappenheim, the former from the Kongo and the latter from Kamerun. The former differs in a more robust and nontubular snout and longer pectoral. It agrees with the Kamerun species in the tubular snout and pectoral, but differs in details of fin rays, and from both species it differs in the larger scales.

(For Dr. S. M. E. Goheen, the first to collect fishes in Liberia.)

LABEO CURRIEL, new species.

Head, $3\frac{2}{3}$; depth, $3\frac{1}{3}$; D. II, 10; A. III, 5; P. I, 17; V. I, 8; scales, 32 in lateral line to caudal base and 4 more on latter; 5 scales above

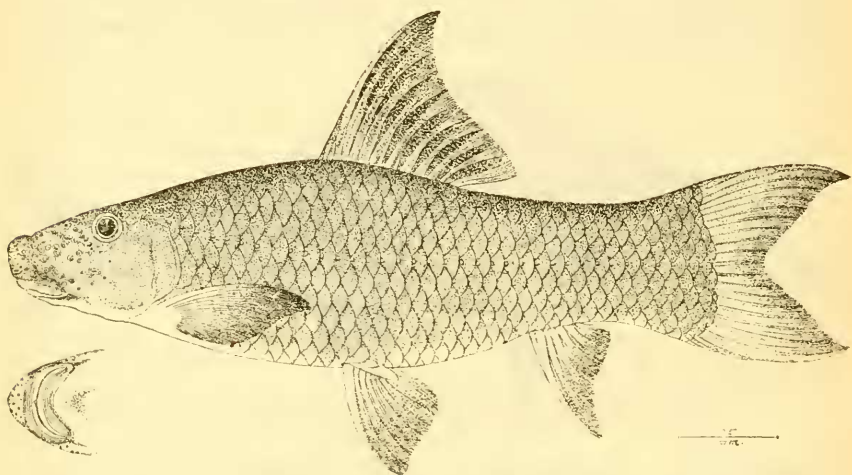


FIG. 8.—LABEO CURRIEL.

lateral line to dorsal origin and 5 below to anal origin; predorsal scales, 13; head width, $1\frac{1}{2}$ its length; head depth at occiput about $1\frac{1}{3}$; snout, $1\frac{7}{8}$; eye, $5\frac{3}{4}$; maxillary, $1\frac{7}{8}$; interorbital, $2\frac{1}{3}$; first branched dorsal ray, $1 + \frac{1}{10}$; first branched anal ray, $1\frac{1}{3}$; upper caudal lobe, $1 + \frac{1}{4}$; pectoral, $1\frac{1}{8}$; ventral, $1\frac{1}{3}$; least depth of caudal peduncle, $1\frac{1}{2}$.

Body deep, with robust contour, compressed, deepest at dorsal origin, and edges all convex. Caudal peduncle deep, compressed strongly; length about three-fifths its least depth.

Head moderate, compressed; cheeks not much swollen. Snout broad, convex over surface, long as wide. Eye small, front edge about midway in head length, supero-lateral, entirely visible from above but not below. Mouth broad, slightly crescentic as seen below; lower jaw greatly inferior. Maxillary to hind nostril. Lips thick, fleshy, inner surface formed with transverse plicae made up of

papillae. Small barbel near end of maxillary largely concealed. Each jaw edge as firm, entire horny sheath. Nostrils together, separated by short skinny flap, at last fourth in snout. Interorbital broad, slightly convex.

Gill-opening forward nearly to hind eye edge. Rakers, about $16+65$, weak, flexible, 3 in filaments and latter about equal eye. Pharyngeal teeth, 2, 4, 5—5, 4, 2, each with broad grinding surfaces and no terminal hook. Each pharyngeal arch with an outer row of four extra deciduous teeth; these more obtuse and without grinding surfaces.

Scales large, rather narrowly uniform in exposure; scarcely smaller on caudal base, though much more so on breast, so about 18 transversely across between pectoral origins. Free pointed scaly ventral flap about two-fifths of fin. Scales finely striate, about 24 to 28 basal and 60 to 70 apical, circuli all very fine but not complete apically. Lateral line midway along side, complete, inconspicuous, nearly straight, and with small simple tubes.

Dorsal origin about midway between snout tip and caudal base, upper edge concave, first branched ray longest and extends far back as tip of last or $1\frac{2}{3}$ to caudal base. Anal inserted about opposite tip of depressed dorsal, fin falcate, with first branched ray longest and reaching slightly beyond caudal base, though not quite to hind limit of caudal squamation. Caudal deeply forked, lobes pointed and upper little longer; fin large. Pectoral moderate, extends three-fourths to ventral. Latter inserted about opposite third branched dorsal ray base, and fin three-fourths to anal, though not quite to vent.

Color in alcohol deep dusky-brown, paler or more brownish below, on belly, and under surface of head. On sides and back edges of each scale slightly darker than general color. Lips pale. Fins all dusky, and on lower fins more or less dusky blackish on outer portions with narrowed paler edges. Iris dull slaty.

Length, 210 mm.

Type.—Cat. No. 48512, U.S.N.M. St. Pauls River, Liberia. Rolla P. Currie.

Also No. 48513, same data, in all three paratypes. These show: head, $3\frac{1}{2}$ to $3\frac{2}{3}$, depth, $3\frac{1}{8}$ to $3\frac{1}{3}$; D. III , 10 or III , 11; A. II , 5 or 6; scales, 30 to 32 in lateral line to caudal base and 3 or 4 more on latter; 5 scales above lateral line and 5 below; 10 or 11 predorsal scales; snout, $1\frac{7}{8}$ to 2 in head; eye, $5\frac{3}{4}$ to 7; maxillary, 2 to $2\frac{1}{3}$; interorbital, $2\frac{1}{2}$ to $2\frac{2}{3}$; length, 154 to 180 mm.

This species falls with *Labeo nasus* Boulenger and *Labeo greenii* Boulenger, both from the Kongo, according to Boulenger's key, as it has 16 or 17 scales around the caudal peduncle. It differs from either, however, in the more obtuse snout, which, though finely

tubercular, is not turned upward; deeper body, larger scales, and darker color.

(For Rolla P. Currie, who obtained the types.)

HYDROCYNUS FORSKALII Cuvier.

Head, $3\frac{1}{2}$; depth, $4\frac{1}{4}$; D. II, 8; A. III, 13; scales 44 in lateral line to caudal base and 4 more on latter; 8 scales above lateral line, 3 below to ventral, and same below to anal; 19 predorsal scales; snout, $2\frac{7}{8}$ in head from upper jaw tip; eye, $4\frac{1}{5}$; maxillary, $2\frac{1}{2}$; interorbital, $3\frac{1}{2}$. Elongate, compressed, deepest at dorsal origin. Caudal peduncle compressed; least depth, $1\frac{2}{5}$ its length, or $2\frac{2}{5}$ in head. Head well compressed, sides flattened; width, about $2\frac{1}{4}$ its length. Snout, conic, long as wide. Eye, high, covered with broad adipose lid in front and behind; hind pupil edge about midway in head length. Mouth, rather large, with powerful convex jaws, lower little protruded. Upper jaw with 10 and lower with 8 large teeth. Maxillary largely concealed below broad suborbital, reaches pupil. Nostrils together, hind one about last fourth in snout. Interorbital broad, very slightly convex. Rakers, II, 3 + 10 II, lanceolate, about two-thirds of filaments and latter $1\frac{4}{5}$ in eye. Scales mostly uniform, in even lengthwise rows, but little smaller on caudal base. Free pointed axillary ventral scaly flap about two-fifths of fin. Scales with fine even basal circuli and one basal ray. Lateral line largely straight, decurved suddenly from shoulder, low along caudal peduncle side. Tubes slender, well exposed, simple. Dorsal origin midway between mandible tip and caudal base; first branched ray $1\frac{1}{2}$ in head; adipose fin, 4. Anal inserted slightly nearer caudal base than ventral origin; first branched ray about 2 in head. Caudal deeply forked, long slender lobes about an eye-diameter longer than head, pectoral $1\frac{2}{3}$, ventral, $1\frac{3}{4}$. Color in alcohol, dull brown, paler below. Narrow blackish brown longitudinal streak along each row of scales on trunk. Dorsals and caudal with outer or hind edges dusky gray, and median portion of lower caudal lobe tinged with same. Lower fins brownish, median portions brighter brownish. Iris, slaty. Length, 237 mm. C.

ALESTES LONGIPINNIS Günther.

Head, $3\frac{1}{2}$ to $3\frac{2}{3}$; depth, $2\frac{1}{2}$; D. II, 8; A. III, 18; scales, 27 to 30 in lateral line to caudal base and 3 more on latter; 6 scales above lateral line, 3 below; 12 or 13 predorsal scales; snout, $3\frac{1}{4}$ to $3\frac{1}{2}$ in head; eye, $3\frac{1}{4}$ to $3\frac{1}{3}$; maxillary, $2\frac{3}{4}$ to 3; interorbital, $2\frac{3}{5}$ to $2\frac{2}{3}$. Deeply ellipsoid, compressed, deepest at dorsal origin. Head width $1\frac{4}{5}$ to 2 in its length. Snout conic, length three-fourths its width. Eye advanced, hind pupil edge about midway in head length. Maxillary to eye, largely concealed. Mouth broad, short, gape not quite half way to eye; jaws about even. Upper teeth 6 + 8, lower

8+2. Nostrils together, at last two-fifths in snout. Interorbital convex. Lower suborbital meets horizontal preopercle limb, and others leave but very narrow naked strip on cheek in front and behind at corner. Rakers, 8+14, lanceolate, weak, about three-fifths of filaments and latter about $1\frac{2}{3}$ in eye. Scales large, well exposed, each with 4 basal striae, 1 above and another below as vertical, and pair of apical. Dorsal inserted midway between nostrils and caudal base, first 4 branched rays prolonged and filamentous, and third nearly to caudal base. Adipose fin about long as eye. Anal inserted close behind dorsal base, first branched ray 2 to $2\frac{1}{8}$ in head. Caudal well forked, lower lobe slightly longer, $\frac{1}{4}$ to $\frac{1}{2}$ eye-diameter longer than head, pectoral $1\frac{1}{6}$ to $1\frac{1}{4}$, ventral, $1\frac{1}{6}$. Color in alcohol with back brown; side and below pale or whitish. Large black blotch on caudal peduncle extends out and includes median caudal rays. Fins all pale; dorsal and caudal each with some brownish on membranes. Length, 111 to 113 mm. Two examples. C.

The dorsal rays end in long filaments, nearly long as rest of the fin in male.

ALESTES RUTILUS Boulenger.

Head, $3\frac{1}{2}$; depth, $3\frac{1}{5}$; D. II, 8; A. III, 13; scales, 22 in lateral line to caudal base and 2 more on latter; 5 scales above lateral line, 2 below; 8 predorsal scales; snout, 3 in head; eye, $3\frac{3}{4}$; maxillary, 3; interorbital, $2\frac{1}{4}$. Deeply ellipsoid, well compressed, deepest at dorsal origin. Head, width $1\frac{2}{3}$ its length. Snout broadly conic; length, four-fifths its width. Eye advanced, hind pupil edge about midway in its length. Maxillary well exposed, not to eye or only to hind nostril. Mouth, broad, short, gape about two-fifths to eye; lower jaw slightly shorter. Upper teeth, 10+8; lower, 8+2. Nostrils together about last third in snout. Interorbital convex. Lower suborbital meets horizontal preopercle limb, and others leave narrow naked strip on cheek in front and behind at corner. Rakers, 14+16, lanceolate, about three-fourths of filaments and latter 2 in eye. Scales very large, well exposed, each with 4 basal striae, 1 above and another below as vertical, and 4 or 5 apical. Dorsal inserted about midway between hind eye edge and caudal base; first branched ray, $1\frac{1}{4}$ in head; adipose fin, $4\frac{4}{5}$. Anal inserted well behind dorsal base but close before last ray's tip, first branched ray $1\frac{3}{4}$ in head. Caudal well forked, about $1+\frac{1}{6}$ in head; pectoral, $1\frac{1}{4}$; ventral, $1\frac{2}{5}$. Color in alcohol with back brown, paler below, edge of each scale on back narrowly darker. Obscure dusky blotch on caudal base within squamation. Dorsal and caudal brownish, with dusky on outer portions. Other fins pale with brownish on outer portions, dusky on anal. Iris olive-slaty. Length, 150 mm. C.

This differs from Boulenger's account in the median caudal rays with a pale shade and obscure blotch of darker at caudal base.

HOLOPTERURA PLUMBEA Cope.

Holopterura plumbea COPE, Trans. Amer. Philos. Soc. Phila., (2) vol. 14, 1871, p. 482. West Africa.

Head, 8; depth, $32\frac{2}{3}$; snout, $6\frac{7}{8}$ in head; eye, $9\frac{3}{4}$; maxillary, $3\frac{1}{2}$; interorbital, 8; mandible, $2\frac{4}{5}$; pectoral, 6; about 114? pores distinct in lateral line; head, $3\frac{2}{5}$ to vent. Compressed, elongate, sides rather flattened, and tail gradually tapers behind but not acuminate at tip. Head moderately compressed; pharynx scarcely swollen, profiles similar; width, $4\frac{1}{2}$ its length; depth, $3\frac{2}{3}$. Snout conic; upper profile and surface convex; basal width, $1\frac{1}{6}$ its length; tip projecting well beyond mandible. Eye large, rather ellipsoid, without eyelid, center trifle before first fifth in head. Mouth large, broad, horizontal, or but slightly inclined. Lips fleshy, entire, rather thick. Teeth conic, sharp pointed, mostly directed back, moderate in size, not continuous above with premaxillary or vomerine series. Upper lateral teeth biserial. Mandibular teeth similar, continuous across symphysis. Several rather large premaxillary teeth, visible from below

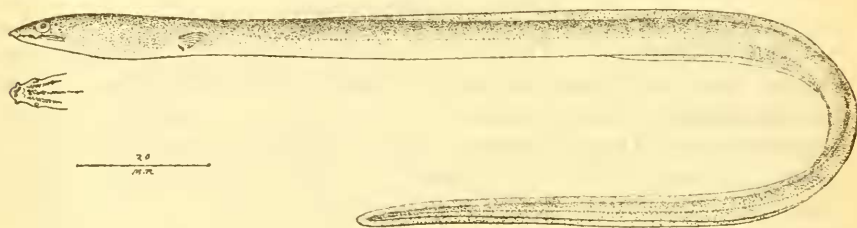


FIG. 9.—HOLOPTERURA PLUMBEA COPE.

in closed mandible. Vomerine teeth like upper laterals, beginning just behind front nostril, biserial, conic, slope backward and anterior little enlarged. Most all teeth little larger anteriorly in jaws. Tongue not evident. Mandible shallow; surface rather depressed, rami low. Front nostril in small tube on upper lip opposite closed mandible tip. Hind nostril deep slit in upper lip opening downward below front eye edge. Interorbital convex. Gill-opening inclined in crescent from opposite upper median pectoral rays obliquely back, about equals eye. Skin rather smooth, with more or less distinct longitudinal wrinkles on lower surface of head and pharynx. Pores on head little evident. Lateral line begins above on head little before middle in latter's length, slightly elevated at first along side of trunk, soon median, ends short space before tail tip. Dorsal origin distant from gill-opening, equals space between gill-opening and front eye edge; fin low, continuous with low caudal behind. Caudal length about three-fourths in eye. Anal, like dorsal, joins caudal behind. Pectoral small, upper ray longest. Vent close before anal. Color in alcohol largely brownish, obscurely dotted with darker. Head above

like back, pale below. Iris pale slaty. Fins all pale brown. Length, 232 mm.

No. 22964 A. N. S. P., type of *H. plumbea* Cope. West Africa. Dr. S. M. E. Goheen.

Cope says, "Anterior nostrils (posterior in position) concealed within the lip in front of the eye; posterior nostrils tubular, deflected and posterior to the apex of the muzzle," though I find them as described above. Further, the "branchial slits approximated below the small pectoral fins" are not more so than in related genera. Cope also says, "No canines," though most of the anterior teeth are a little enlarged. None of the teeth is hardly "one-rowed behind" except perhaps at the extreme hind areas, where they are very small.

OPHICHTHUS RUFUS (Rafinesque).

One example, 349 mm. It agrees with four examples from Italy in every respect except the minor character of a thicker snout, which doubtless a condition of preservation. C. C.

ECHIDNA PELI (Kaup).

Three examples, 274 to 504 mm. G.

APLOCHEILUS SPILAUCHEN (A. Dumeril).

Twenty-seven examples. C.

SCOMBEROMORUS ARGYREUS Fowler.

Scomberomorus argyreus FOWLER, Proc. Acad. Nat. Sci. Phila., 1904, p. 764, pl. 51, lower fig. "West Africa."

Type.—No. 11400, A.N.S.P., examined. S.

CARANX AFRICANUS Steindachner.

One example, 248 mm. S.

TRACHINOTUS GOREENSIS Cuvier.

One example, 183 mm. S.

CHLOROSCOMBRUS CHRYSURUS (Linnaeus).

Chloroscombrus hesperius FOWLER, Proc. Acad. Art. Sci. Phila., 1906, p. 114, fig. 1. West Africa.

The type of *C. hesperius*, No. 11198, A.N.S.P., examined. S.

GALEOIDES DECACTYLUS (Bloch).

One example. 162 mm. S.

ANABAS KINGSLEYAE (Günther).

Head, $2\frac{3}{4}$; depth, $2\frac{2}{5}$; D. XVI, 10; A. IX, 10; scales, 17 in upper section of lateral line and 8 in horizontal section to caudal base;

3 scales above upper lateral line to spinous dorsal origin and 9 below to spinous anal origin; 15 predorsal scales; snout $3\frac{7}{8}$ in head from upper jaw tip; eye, $3\frac{7}{8}$; maxillary, 3; interorbital, 3. Well compressed, deepest medially, caudal peduncle not developed or rudimentary. Head width nearly half its length. Snout broadly conic, length $\frac{4}{5}$ its width. Eye round, hind edge midway in head length. Mouth small, moderately inclined; lower jaw very slightly protruded. Maxillary to eye. Bands of small conic teeth in jaws, front ones little longer, none on mouth roof. Interorbital convex. Preorbital and preopercle entire; hind edges of opercle and subopercle spinous. Rakers, 5 short firm points, half of filaments, which about two-fifths of eye. Scales with about 22 basal striae and fine circuli, all finely ctenoid. All rayed vertical fins densely scaled over greater portions basally. Cheek with five rows of scales. Tubes in lateral line simple, well exposed, not out over caudal base. Last dorsal spine $2\frac{5}{8}$ in head; sixth dorsal ray, $1\frac{5}{8}$; last anal spine, $2\frac{7}{8}$; sixth anal ray, $1\frac{7}{8}$; caudal, $1\frac{1}{2}$; pectoral, $1\frac{1}{2}$; ventral, 2. Color in alcohol dark brown generally. Round blackish blotch at end of lower lateral line over two scales at least. Head below and breast dull brown. Iris slaty. Length, 84 mm. C.

TILAPIA GALILAEA (Linnaeus).

Head, $2\frac{1}{2}$ to $2\frac{3}{4}$; depth, 2 to $2\frac{1}{2}$; D. XV, one XIV, 12 to 14; A III, 11 or 12; scales, 19 in upper section of lateral line, 11 or 12 in lower section to caudal base, and 2 more out on latter; 4 scales above upper section of lateral line to spinous dorsal origin, 10 below to spinous anal origin; predorsal scales, 10 to 13; snout, $2\frac{4}{5}$ to 3 in head; eye, $3\frac{1}{4}$ to $3\frac{1}{2}$; maxillary, $3\frac{2}{5}$ to $3\frac{3}{4}$; interorbital, 3 to $3\frac{1}{2}$. Head width, 2 in its length. Snout convex; length, long as width or little less. Maxillary very slightly beyond nostril, well short of eye. Teeth rather slender, incisor-like; ends notched; outer rather large. Interorbital little convex. Rakers, 4+20, short, lanceolate, about 2 in filaments and latter $1\frac{3}{4}$ in eye. Scales cycloid, extend on caudal basally. Circuli moderate, mostly complete, basal radii 13 or 14 and apical denticles slightly developed or short. Fourth dorsal spine about $2\frac{1}{2}$ in head; third anal spine, $2\frac{3}{5}$ to $2\frac{3}{4}$; caudal, $1\frac{1}{2}$ to $1\frac{1}{4}$; pectoral, $1\frac{1}{10}$; ventral spine, $2\frac{1}{8}$ to $2\frac{2}{5}$. Color in alcohol brownish, paler below, with about seven indistinct darker brownish bands on back above. Fins all pale, with dark blotch at origin of soft dorsal and two or three oblique dark streaks on latter forward. Caudal slightly emarginate, with hind edge dusky. Length, 55 to 66 mm. Three examples. C.

TILAPIA BEUDELOTI A. Dumeril.

One adult. C.

TILAPIA SAVAGEI, new species.

Head, 3; depth, $2\frac{2}{3}$; D. XV, 13; A. III, 9; P. 1, 13; V. I, 5; scales, 22 in upper section of lateral line, 10 in lower section to caudal base, and 2 more out on latter; 5 scales above upper section of lateral line to spinous dorsal origin, 9 below to spinous anal origin; 11 predorsal scales; head width, $1\frac{1}{4}$ its length; snout, 3; eye, 4; maxillary, $2\frac{4}{5}$; interorbital $3\frac{2}{5}$; last dorsal spine, $1\frac{9}{10}$; fourth dorsal ray, 1; third anal spine, $2\frac{1}{8}$; third anal ray, 1; least depth of caudal peduncle, $2\frac{1}{8}$; pectoral, $1\frac{1}{8}$; ventral spine, $2\frac{7}{8}$.

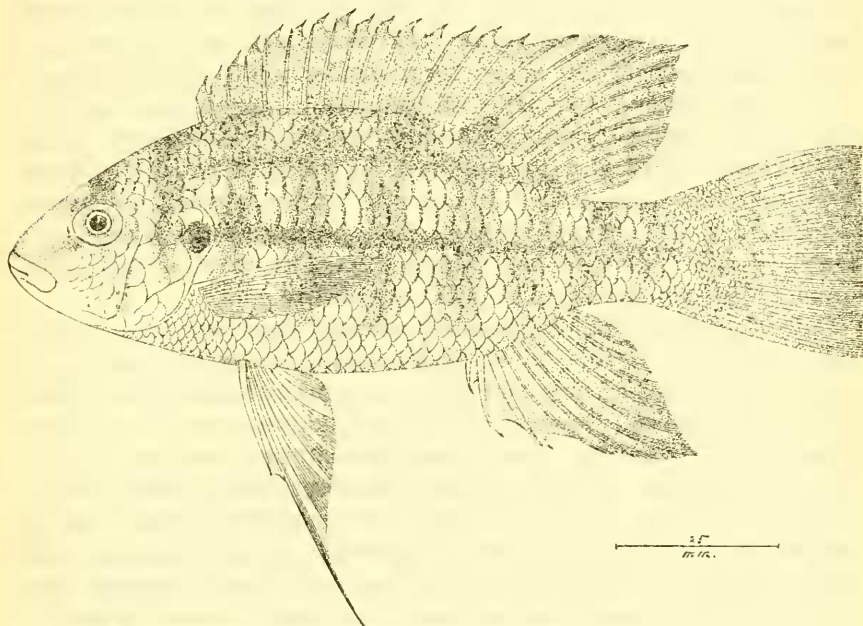


FIG. 10.—TILAPIA SAVAGEI.

Body elongately ellipsoid in contour, deepest at ventral spine tip; edges all convex, well compressed. Caudal peduncle well compressed; length, about two-thirds of least depth.

Head compressed, flattened sides converging about evenly above and below. Snout conic, surface convex, long as wide. Eye little ellipsoid; center nearly midway in head length and but little elevated. Mouth small, gape about two-thirds to eye, and lower jaw very slightly shorter. Maxillary beyond nostril, but not to eye; expansion $2\frac{1}{8}$ in latter. Lips firm. Teeth in about five rows above and three below, with outer row in each jaw largest, moderately slender, expanded and notched at ends. Nostril simple pore at last two-fifths in snout. Interorbital broad, slightly convex. Preopercle and preorbital edges entire; width of latter, about $1\frac{1}{8}$ in eye.

Gill-opening forward about to front eye edge. Rakers, 2+14, lanceolate, short or about one-third in filaments and latter two in eye. Isthmus narrowly triangular.

Scales large, cycloid, rather well exposed, small on breast or about 25 rows before ventral. Caudal covered with small scales over basal half; other fins naked. Cheek with four rows of scales. Scales with complete fine circuli and 11 basal converging radii. Upper section of lateral line slightly convex, and lower begins 2 scales before terminus of upper. Tubes all simple and well exposed.

Spinous dorsal inserted behind pectoral base; spines all graduated up toward last, which longest; fin edge notched and small skinny flap from behind tip of each spine. Soft dorsal with rays all graduated up to fourth or longest, which form slender point extending back about opposite first two-fifths in caudal. Spinous anal inserted opposite soft dorsal origin, graduated to third or longest ray which forms slender filament extending back to middle of caudal. Caudal with hind edge truncate. Pectoral with upper rays longest, three-fourths to anal. Ventral inserted close behind pectoral base, first branched ray ending in long filament reaching base of third anal spine. Vent about half an eye-diameter before anal.

Color in alcohol dull brownish generally; lower surfaces of head and trunk paler. Nine broad dusky brown transverse bands over back; first connecting eyes and those on trunk extended down opposite pectoral base. Opercle with conspicuous rounded black spot little smaller than eye. Dark band from lower front eye edge to end of maxillary. At front of soft dorsal basally large black blotch. Also dusky-brown horizontal band, much narrower than any of vertical ones, extends from behind opercular dark blotch to caudal base medially. Vertical fins dull brownish-dusky leaving pale obscure blotches, and other fins pale. Iris slate. Lower lip pale.

Length, 128 mm.

Type.—Cat. No. 48504, U.S.N.M. St. Paul's River, Liberia. Rolla P. Currie.

Also No. 48,503, including four examples, same data, paratypes. These show: head, 3 to $3\frac{5}{8}$; depth, $2\frac{1}{8}$ to $2\frac{1}{2}$; D. XV or XVI, 13; A. III, 9 or 10; scales, 21 or 22 in upper section of lateral line; 8 or 9 in lower section to caudal base and 2 more on latter; 5 scales above lateral line and 10 below; snout, $2\frac{1}{2}$ to $2\frac{7}{8}$ in head; eye, $3\frac{1}{4}$ to $3\frac{3}{8}$; maxillary, 3 to $3\frac{1}{8}$; interorbital, 3 to $3\frac{1}{8}$. Snout long as broad or little smaller in younger examples. Maxillary to eye in young slightly shorter or not much beyond eye with age. Last dorsal spine, $1\frac{9}{10}$ to 2 in head; fourth dorsal ray, $1\frac{1}{8}$ to $1\frac{3}{8}$; third anal spine, $2\frac{1}{8}$ to $2\frac{1}{8}$; third anal ray, 1 to $1\frac{1}{4}$; caudal, 1 to $1\frac{9}{10}$; pectoral, $1\frac{1}{8}$ to $1\frac{1}{4}$; ventral spine, $1\frac{1}{8}$ to $2\frac{1}{8}$. Length, 90 to 116 mm.

Related to *Tilapia brevimanus* Boulenger, from Portuguese Guinea, in contour, cheek scales, dentition and squamation generally. It differs, however, in the presence of a horizontal dark median band, deeper body, rather fewer dorsal spines, mostly more anal rays, and longer pectoral.

(For the Rev. Thomas S. Savage, who collected fishes many years ago in Liberia.)

TILAPIA BÜTTIKOFERI (Hubrecht).

Head, $2\frac{3}{4}$ to $2\frac{7}{8}$; depth, 2 to $2\frac{1}{8}$; D. XIV or XV, 16 or 17; A. III, 11 or 12; scales, 21 or 22 in upper section of lateral line, 11 to 13 in lower section to caudal base, and 2 or 3 more on latter; predorsal scales, 14 or 15; snout, $2\frac{2}{5}$ to 3 in head; eye, $3\frac{1}{2}$ to 5; maxillary, 3 to $3\frac{2}{5}$; interorbital, $2\frac{1}{2}$ to 3. Body well compressed: contour deeply ellipsoid, deepest at end of ventral spine. Caudal peduncle compressed; length, $1\frac{3}{4}$ to 2 in its least depth and latter 2 in head. Head width, $1\frac{4}{5}$ to $1\frac{7}{8}$ in its length. Snout broad as long; length, four-fifths its width in young. Eye little elevated, about midway in head length, slightly advanced in young. Mouth moderate, terminal, jaws about even. Maxillary slightly beyond nostril; expansion about $1\frac{1}{4}$ in eye. Teeth in strong outer row in each jaw, truncate, and with two inner rows above and below inside inconspicuous. Young with outer teeth more notched and single inner row above and below. Interorbital convex. Rakers, 4+10 or 11 short strong points, about 2 in filaments, and latter $1\frac{7}{8}$ in eye. Scales, large, cycloid, circuli very fine and about 14 radiating basal radii, 11 in young. Caudal scaly over basal two-thirds, at least on membranes of fin. Cheek with five rows of scales; vertical diameter of cheek below eye equals $1 + \frac{1}{4}$ eye-diameters. Tubes in lateral line simple, over entire scale exposure. Last dorsal spine, $1\frac{4}{5}$ in head (2 in young), sixth dorsal ray, $1\frac{1}{8}$ ($1\frac{2}{5}$ in young); third anal spine, $2\frac{2}{5}$ ($2\frac{1}{8}$ in young). Caudal truncate, slightly convex when expanded, $1\frac{1}{4}$ in head ($1\frac{2}{5}$ in young); pectoral, $1\frac{1}{6}$ ($1\frac{1}{3}$ in young); ventral spine, $2\frac{1}{6}$ (2 in young). Color in alcohol dull brownish generally, with 8 broad blackish vertical bands, meeting below, first through eye and last at caudal base. Pectoral pale brownish; other fins mostly blackish; all with pale edges. Young with broad dusky bands reflected on vertical fins, so that soft dorsal and anal with three dark transverse blotches or streaks; basal much larger and black. Also young usually with another transverse black band across caudal near base. Black blotch at corner of opercle little smaller than eye, and all with conspicuous black blotch at origin of soft dorsal where transverse dark band crosses. Iris slaty. Length, 75 to 245 mm.; three examples.

These differ from Boulenger's examples slightly,¹ the adult having the long ventral filaments extending back beyond anal base, but

¹ Cat. Fresh Water Fish, Africa, vol. 3, 1915, p. 214, fig. 138.

little short of last anal ray tip. An example in the Academy, 58 mm. long, from "West Africa," without donor is doubtless from Goheen or Savage.

HEMICHROMIS FASCIATUS Peters.

Hemichromis auritus GILL, Proc. Acad. Nat. Sci. Phila., 1862, p. 135.

Head, $2\frac{2}{3}$ to $2\frac{5}{8}$; depth, $2\frac{3}{4}$ to $2\frac{5}{8}$; D. XIV, sometimes XV, rarely XIII, 11, sometimes 12; A. III, 9; upper branch of lateral line, 16 to 20 scales; lower section, 9 to 12 to caudal base and 1 to 3 more on latter; 4 scales above lateral line to spinous dorsal origin, 9 scales below to spinous anal origin, rarely 10; predorsal scales, 9 to 11; snout, $2\frac{4}{5}$ to $3\frac{1}{4}$ in head, measured from upper jaw tip; eye, $3\frac{2}{3}$ to $4\frac{2}{3}$; maxillary, $2\frac{3}{5}$ to 3; interorbital, 3 to $3\frac{3}{5}$. Elongately ellipsoid, deepest at sixth dorsal spine base. Caudal peduncle well compressed; length about three-fourths its least depth and latter $2\frac{1}{2}$ in total head length. Head width, $2\frac{1}{6}$ its length. Snout conic, slightly longer than broad, or broad as long in young. Eye little elevated, hind pupil edge midway in head length, slightly advanced in young. Maxillary about to eye, expansion about two-thirds of pupil. Teeth conic, uniserial below and above, upper outer series well separated from much smaller inner row; latter absent in young. Interorbital broadly convex. Rakers, 1 or $2+8$ to 10, anvil-shaped, about two-thirds of filaments and latter $1\frac{1}{2}$ in eye. Scales large, cycloid, extend out over two-thirds of caudal; circuli fine and incomplete apically; basal radiating striae, 10 or 11. Check with 4 or 5 rows of scales. Small scales on breast like those on caudal base. Spinous dorsal begins before pectoral; last spine, $2\frac{1}{2}$ to $2\frac{3}{5}$ in head; sixth dorsal ray, $1\frac{2}{3}$ to $2\frac{1}{5}$. Anal begins about midway between pectoral origin and caudal base; third spine about 3 in head; fourth anal ray, $1\frac{7}{8}$ to $2\frac{1}{4}$. Caudal convex behind, truncate in some examples, $1\frac{1}{4}$ to $1\frac{1}{2}$ in head; pectoral, $1\frac{3}{5}$ to $1\frac{3}{4}$; ventral, $1\frac{2}{5}$. Color in alcohol generally dull brownish above, paler to whitish below, sides with five large vertical blotches of black, continued up over back narrower and paler, and between them on side medially each scale with brownish blotch at hind edge. Black blotch on opercle little smaller than eye, with brownish area forward to latter. Iris gray-brown; soft vertical fins often with few pale spots or blotches basally, upper caudal corner and edge of soft dorsal sometimes whitish. Iris brownish. Length, 60 to 162 mm. One from Liberia (C.) also type of *Hemichromis auritus* Gill (S.), and 15 from Angola, as listed further on.

HEMICHROMIS BIMACULATUS GILL.

Head, $2\frac{3}{5}$ to $2\frac{3}{4}$; depth, $2\frac{3}{4}$ to $2\frac{7}{8}$; D. XIV, rarely XIII or XV, 11, rarely 10; A. III, 8, rarely 7; scales 17 to 19 in upper section of lateral line, 8 to 11 in lower section to caudal base, and 2 more on latter; 3 or 4 scales above lateral line to spinous dorsal origin, 9 or 10

below to spinous anal origin; 11 or 12 predorsal scales; snout, $3\frac{1}{2}$ to $3\frac{3}{4}$ in head from upper jaw tip; eye, $3\frac{3}{4}$ to 4; maxillary, $2\frac{7}{8}$ to 3; interorbital, $3\frac{3}{4}$ to 4. Elongately ellipsoid, deepest opposite ventral spine tip. Caudal peduncle well compressed; length about three-fourths its least depth and latter $2\frac{1}{2}$ to $2\frac{3}{4}$ in total head length. Head width, 2 to $2\frac{1}{2}$ its length. Snout conic, long as broad or length slightly less with age. Eye slightly elevated; hind pupil edge about midway in head length, slightly advanced in young. Mouth moderate, lower jaw slightly protruded. Teeth conic, mostly uniserial, sometimes inner row of small obscure ones above and well back. Interorbital broadly convex. Rakers 3+5, anvil-shaped, about 2 in eye. Scales large, cycloid, out over caudal at least halfway basally, with fine circuli incomplete apically and 10 or 11 basal radiating striae. Cheek with 3 or 4 rows of scales. Small scales on breast like those on caudal base. Spinous dorsal inserted opposite pectoral origin; last spine, $2\frac{7}{8}$ to $3\frac{1}{4}$ in head, sixth ray $1\frac{1}{2}$ to 2. Spinous anal midway between ventral origin and caudal base; third spine, 3, fourth ray, 2 to $2\frac{1}{2}$. Caudal convex behind, $1\frac{1}{2}$ in head; pectoral, $1\frac{1}{2}$ to $1\frac{1}{2}$; ventral $1\frac{1}{2}$ to $1\frac{3}{4}$. Color in alcohol brown above with olive tint; below, paler to whitish. Black blotch nearly large as eye on opercle; another just before anal and usually third at caudal base. Median dark, usually lengthened as vertical streaks and 5 dark leaden vertical streaks across back in front of it and as many more toward tail. Fins largely pale brownish, uniform. Iris brownish. Length, 60 to 108 mm. Nine examples (C.), and one (C. C.).

DREPANE PUNCTATA (Linnaeus).

Cryptosmilia luna COPE, Trans. Amer. Philos. Soc. Phila., ser. 2, vol. 13, 1867, p. 401. "Western African seas."

Head, 3; depth, 1; D. I, IX, 21; A. III, 17; scales 44 (pockets) in lateral line to caudal base and 4 more on latter; 12 scales above lateral line, 30 below to anal origin; snout, $2\frac{3}{4}$ in head; eye, 3; maxillary, $3\frac{1}{4}$; interorbital, 4. Deeply rhomboid, greatly compressed, least depth of caudal peduncle, $2\frac{3}{4}$ in head. Head width 2 in its length. Snout compressed, width $1\frac{1}{2}$ its length. Eye well elevated, advanced. Mouth small; lower jaw slightly shorter. Maxillary well exposed, about to eye. Teeth brush-like, in bands in jaws. Interorbital slightly convex. Lower preopercle edge serrate. Rakers, 5+11 short weak points, about one-fifth of filaments and latter 2 in eye. Scales all narrowly exposed, small ones extending over vertical fins basally and breast. Cheek with 8 rows of scales to preopercle corner. Ventral axil with free pointed scaly flap about half ventral spine. Suprascapula entire. Scales with fine complete circuli, and 3 basal radii convergent. Lateral line steeply arched, and simple tubes well exposed. Fourth erect dorsal spine longest,

$1\frac{2}{3}$ in head, ninth ray nearly 1. Second anal spine, $2\frac{1}{2}$ in head; first ray about $1\frac{1}{2}$. Caudal with median rays longest, slightly larger than head; ventral spine, $1\frac{1}{2}$, and first ray with filamentous end to second anal ray base. Long falcate pectoral reaches caudal base. Color in alcohol largely pale brownish; head and trunk everywhere tinged with silvery-white. Iris whitish. Length, 140 mm.

No. 12229, A. N. S. P., type of *Cryptosmilia luna* Cope. S.

Although described as "everywhere uniform silvery" by Cope, very slight indications of the darker transverse or vertical bands, somewhat as figured by Pellegrin in his var. *africana*,¹ are evident. This last was originally described by Osorio and appears in no way to differ structurally from the above. Further comparison with Philippine material, but slightly smaller, shows only a slight difference in scale structure or with usually 5 or 6 basal radii, while the Liberian example has but 3 or 4 and usually 3.

PSETTUS SEBAE Cuvier.

One example. G.

MAPO SOPORATOR (Valenciennes).

One 85 mm. C. C.

PERIOPHTHALMUS BARBARUS (Linnaeus).

Two small ones. G.

PSETTODES ERUMEI (Schneider).

Head, $3\frac{3}{4}$; depth, $2\frac{2}{3}$; D. 54; A. 40; scales, 70 in lateral line to caudal base and 6 more on latter; 21 scales above lateral line, 27 below; snout, $3\frac{1}{2}$ in head from upper jaw tip; eye, $6\frac{3}{4}$; maxillary, $1\frac{1}{2}$; interorbital, $2\frac{1}{5}$ in snout. Contour uniform ellipsoid. Caudal peduncle well compressed; length, three-fourths its least depth or latter $2\frac{5}{8}$ in total head length. Head width, $2\frac{3}{5}$ its length. Snout conic, broad as long. Upper eye advanced for first third beyond lower. Mouth large, lower jaw well protruded. Maxillary long, extends well beyond eye or about three-fifths in head; expansion $1\frac{1}{8}$ in eye. Teeth long, slenderly conic, in two rows with inner depressible inward, and all of larger barbed. Interorbital level. Rakers, 14 + 20 short spinose rudiments; filaments, $1\frac{1}{2}$ in eye. Scales large, mostly cycloid; some very weakly and sparsely ctenoid on left or colored side. Smaller scales along body edges, and caudal very finely scaled. About 8 rows of scales on cheek; maxillary also scaly. Scales of colored side with 40 radiating basal striae; same number but marginal on pale side and very fine circuli incomplete. Lateral line midway along side, inconspicuous. Dorsal origin eye-diameter behind lower eye, twenty-third ray, $2\frac{9}{10}$ in head; thirteenth anal ray, $2\frac{1}{4}$. Caudal

¹ Annals L'Inst. Oceanogr., Prince de Monaco, vol. 6, fasc. 4, 1914, p. 57, fig. 58, fig. 9.

double convex behind; median rays longest or $1\frac{1}{4}$ in head; pectoral, 2; ventral left, $2\frac{3}{4}$. Color in alcohol dull brownish on left side, with many well scattered pale spots, none larger than scale exposure. Right side uniform white. Length, 395 mm. S.

A smaller example, 171 mm. long, from Sumatra, differs in the scales having 18 to 20 basal striae, a condition doubtless due to age. Its left or colored side is quite dark, also fins, and without any pale spots.

CYNOGLOSSUS GOREENSIS Steindachner.

Head, $5\frac{2}{3}$; depth, $3\frac{3}{4}$; D. 123; A. 94; scales, 30 + 94 in median lateral line to caudal base; 15 scales above median lateral line at widest part of body to upper lateral line, 24 below at same point; snout, $2\frac{2}{3}$ to lower eye; mouth cleft, 4. Contour evenly elongately ellipsoid. Head width, $4\frac{3}{4}$ its length. Snout broadly depressed; profile nearly complete semicircle. Eye small, about half of interorbital, and upper half advanced before lower. Lower nostril close before upper eye along mouth edge or about midway in mouth cleft. Upper nostril midway between eyes. Mouth cleft on blind side more curved than on colored side. Lips entire. Interorbital very slightly depressed. Scales largest over median portion of trunk, become small and crowded about borders, strongly ctenoid on left or colored side and cycloid on right or blind side; basal striae about 40 to 44 and circuli only complete apically on blind side. Two lateral lines, upper 8 scales from dorsal body edge. Caudal pointed, $1\frac{5}{8}$ in head. Color in alcohol pale uniform brownish on left or colored side; right side whitish. Length, 327 mm. S.

6. ASHANTEE.

The fishes from this country were all obtained by the Eclipse Expedition in the Beyah River at Elmina, or the vicinity of the latter. Though a number of scattered references to the fishes of the Gold Coast occur, the only work of primary faunal interest is Bleeker's celebrated "Memoire sur les Poissons de la côte de Guinée."¹ Günther described a few species in his paper on "New fishes from the Gaboon and Gold Coast."² Sauvage³ and Pellegrin⁴ have both published papers on the fishes of the adjacent Ivory Coast, useful in this connection.

SCOLIODON EUMECES (Pietschmann).

Body compressed, depth $8\frac{2}{3}$ to $9\frac{1}{2}$ to last caudal vertebra. Head depressed, $4\frac{1}{2}$ to $5\frac{1}{8}$ in body; width $1\frac{2}{3}$ to $1\frac{3}{4}$ its length. Snout greatly depressed, long, end blunt, 2 to $2\frac{1}{10}$ in head. Eye about eye-diameter

¹ Nat. Verhandel. Holl. Maats. Wet. Haarlem, vol. 18, 1863, No. 2, pp. 1-136, pls. 1-28.

² Ann. Mag. Nat. London, ser. 3, vol. 20, 1867, pp. 110-117.

³ Bull. Soc. Zool. France, 1882, pp. 313-325, pl. 5, fig. 1.

⁴ Idem, vol. 38, 1913, pp. 151-158.

nearer gill-opening than snout tip, $3\frac{3}{4}$ to $4\frac{1}{2}$ in snout. Nictitating membrane below eye forward. Mouth greatly arched, wider than cleft. Upper labial fold little longer, about fourth of upper jaw. Teeth alike, 24 or 23 below, 25 above, edges entire, bases wide. At front of upper 1 or 2 erect teeth and 2 or 3 in front of lower. Interorbital broadly convex, $2\frac{1}{6}$ to $2\frac{1}{4}$ in head. Gill-openings about wide as eye. Scales with 3 ribs ending in as many points and median longest. First dorsal origin opposite end of inner pectoral angle, extended end behind reaching opposite ventral origin. Second dorsal base about $1\frac{1}{2}$ of anal base and one-third above end of anal base. Second dorsal end behind $1\frac{1}{2}$ to $1\frac{3}{4}$ lengths from its base behind to caudal pit above, which larger. Tail $3\frac{1}{2}$ in entire length. Pectoral, $1\frac{2}{3}$ to $1\frac{3}{5}$ in head; ventral, 3. Color in alcohol ash-gray generally, below whitish. Iris pale. Fins all ash-gray; hind edges of lower, including lower caudal lobe whitish, or at least paler. Border of long caudal lobe narrowly brownish. Length 310 to 314 mm., two examples.

Allied with *Scoliodon lalandi* (Müller and Henle) from the tropical Atlantic of Central and South America. Compared with an example of the American species, 425 mm. long, from Colon, the lower caudal lobe in blackish marginally, front half of pectoral entirely blackish and inner half only pale, and rictal grooves equal. Although Pietschmann describes the rictal grooves they are not indicated in his lower view of the head.

TORPEDO NARKE (Risso).

Disk partly circular, width greater than length for space about equal to space between front disk edge and spiracle. Snout short, slightly concave medially. Mouth small, slightly crescentic, with longitudinal fold at each angle. Teeth small, about 34 rows above and below. Spiracle twice size of eye, with 7 weak papillae. Eye small, 4 in interorbital. Second dorsal about seven-eighths of first, latter with front half above ventral bases. Second dorsal base more than interdorsal space. Tail short, slightly over one-third of total length. Upper caudal lobe slightly longer. Color in alcohol russet-brown above, with scattered variable small white spots or dots, none larger than pupil. White below, outer pectoral and ventral portions broadly brownish submarginally. Length, 367 mm.

Compared with Italian examples the present one differs in coloration, or the presence of the minute whitish spots and the absence of the five large black ocelli. Compared with *Torpedo torpedo* (Linnaeus) from Italy, the spiracle fringes are found well developed in the latter, besides the presence of usually five to seven dark blue-black ocelli.

Although much confusion has arisen from the composite account of *Raja torpedo* Linnaeus it appears the action of Brännich¹ clearly indicates the first restriction of the species with the later *Raja marmorata* Risso. Brännich says: "Dorsum fusco-sanguinolentum, maculis sparsis obscurioribus varium * * * Spiracula 5, subtus utrinque ad pectus." He then mentions a new variety, unknown to himself, however, but described by Salviani with five black ocelli arranged in the form of a pentagon.

MUGIL CEPHALUS Linnaeus.

Head, $3\frac{1}{3}$ to $3\frac{2}{3}$; depth, 4 to $4\frac{1}{3}$; D. IV—I, 8; A. III, 8; scales, 36 to 43 from shoulder to caudal base, and 4 to 6 larger out over latter; 12 or 13 scales transversely between soft dorsal and anal origins; 23 to 27 predorsal scales; snout, $\frac{1}{2}$ to $4\frac{1}{2}$ in head; eye, $3\frac{3}{4}$ to 4; maxillary, $3\frac{3}{4}$ to $4\frac{1}{5}$; interorbital, $2\frac{3}{4}$ to 3. Rakers, 30+32, $2\frac{1}{2}$ in filaments and latter $\frac{1}{3}$ of eye. Length, 95 to 139 mm.; four examples.

Compared with an Italian example, with 41 scales from shoulder to caudal base, the rakers were 33+46. The adipose eyelid much better developed in the Italian fish, though scarcely as much so as in adults from Italy and the Mediterranean. The scales of Italian examples show basal radii 8 to 10, those from Ashantee 7 to 9, doubtless a condition of age.

LIZA RAMADA (Risso).

Head, 3 to $3\frac{2}{3}$; depth, $3\frac{1}{6}$ to $3\frac{1}{2}$; D. IV—I, 8; A. III, 9; scales, 37 to 39(?) from shoulder to caudal base, and 5 or 6 larger out over latter; 12 or 13 scales transversely at soft dorsal and anal origins; 25 to 28 predorsal scales; snout, $3\frac{3}{4}$ to 5 in head; eye, $3\frac{1}{4}$ to 4; maxillary, $3\frac{1}{2}$ to $3\frac{4}{5}$; interorbital, $2\frac{1}{2}$ to $2\frac{7}{8}$; rakers, 35+48. Length, 56 to 85 mm.; four examples.

Though I only have young African examples, doubtless of this species, considerable variation due to age was noted when compared with Mediterranean examples. The latter, 155 mm. long, had 44 to 47+50 to 75 rakers. The African examples show 9 to 11 basal radii and no apical denticles on the scales, while in 8 large Mediterranean examples these variations are covered.

LIZA FALCIPINNIS (Valenciennes).

Head, $3\frac{2}{3}$ to $3\frac{3}{4}$; depth, $3\frac{2}{3}$ to $3\frac{3}{4}$; D. IV—I, 9; A. III, 11; scales, 35 to 39 from shoulder to caudal base and 4 or 5 larger out over latter; 12 or 13 scales transversely between soft dorsal and anal origins; 29 to 31 predorsal scales; snout, $3\frac{7}{8}$ to 4 in head; eye, $3\frac{7}{8}$ to $4\frac{1}{8}$; maxillary, $3\frac{4}{5}$ to 4; interorbital, $2\frac{2}{3}$ to 3. Elongate, well compressed, deepest at anal origin. Caudal peduncle well compressed, long as

¹ Ich. Massiliens., 1768, p. 1.

deep and least depth $2\frac{1}{4}$ to $2\frac{1}{3}$ in head. Head width, $1\frac{3}{4}$ its length. Snout broad, length half its width. Eye advanced; hind edge slightly before center in head length. Mouth broad. Teeth extremely minute, rudimentary, few, in single row and only in upper jaw. Maxillary concealed, not quite to eye. Upper lip width nearly half of pupil. Nostrils close: front one about midway in snout. Interorbital broadly convex. Preorbital denticulate. Rakers, about 40 + 51, finely lanceolate, about half of filaments and latter equal eye. Scales with 7 to 9 basal striae. Cheek with 3 rows of scales. Pectoral without axillary scaly flap, and 4 scales behind depressed spinous dorsal tip and soft dorsal origin. Spinous dorsal inserted midway between eye center and caudal base, or midway between front eye edge and caudal base in small examples; second spine slightly longer, or $1\frac{1}{3}$ to $2\frac{1}{3}$ in head. Soft dorsal inserted much nearer spinous dorsal origin than caudal base, first branched ray, $1\frac{3}{5}$ in head. Anal inserted about midway between ventral origin and caudal base, $1\frac{2}{5}$ to $1\frac{3}{5}$ in head. Caudal large, pupil length in smallest example to eye-diameter longer than head in larger ones: pectoral, $1\frac{1}{4}$; ventral, $1\frac{1}{2}$. Color in alcohol, dull olive-brown above: sides and below, paler with silvery-white reflections. Iris whitish. Fins all pale brownish, with obsolete brownish blotch at pectoral base. Eight examples, 105 to 145 mm.

Boulenger's figure ¹ does not indicate any scales on the opercle; those on the cheek imperfect and front of soft dorsal and anal basally scaleless. In all my examples these areas are quite scaly.

An Angola example in the Academy (Bengo River at Cabiri) shows: head, $3\frac{2}{5}$; depth, $3\frac{3}{5}$; D. IV—I, 9; A. III, 11; scales, 39 from shoulder to caudal base and 6 more on latter; transverse scales, 13; predorsal, 23; snout, 4 in head; eye, $3\frac{3}{5}$; maxillary, 4; interorbital $2\frac{3}{5}$; few scales on front of anal basally; length, 82 mm.

LIZA HOEFLERI (Steindachner).

Head, $3\frac{2}{5}$; depth, $4\frac{1}{5}$; D. IV—I, 8; A. III, 9; scales, 36 from shoulder to caudal base and 5 more on latter; 13 scales transversely between soft dorsal and anal origins; 25 predorsal (pockets) scales; snout, $4\frac{1}{5}$ in head; eye, $3\frac{3}{5}$; maxillary, 4; interorbital, 3. Elongate, rather slender, or deepest at spinous dorsal origin, well compressed. Caudal peduncle with least depth, $1\frac{1}{5}$ its length, or $2\frac{1}{4}$ in head. Head width half its length. Snout length nearly three-fifths its width. Eye advanced; hind edge about midway in head length. Mouth broad; would form obtuse angle. Row of minute ciliate teeth in upper jaw. Maxillary exposed, almost to eye. Nostrils close together, front one about midway in snout length. Interorbital broadly convex. Preorbital denticulate. Rakers, 35 + 46, about

¹ Cat. Fresh Water Fish. Africa, vol. 4, 1916, p. 89, fig. 51.

three-fourths of filaments, or $1\frac{1}{4}$ in eye. Scales with 9 or 10 basal radii. Cheek with three rows of scales. Apparently no axillary ventral flap, and three scales between depressed spinous dorsal tip and soft dorsal origin. A few scales on front of anal basally. Spinous dorsal inserted about midway between front pupil edge and caudal base; first spine longest, or $1\frac{1}{3}$ in head. Soft dorsal inserted very slightly nearer caudal base than spinous dorsal origin; first branched ray, $1\frac{1}{3}$ in head. Anal inserted slightly before soft dorsal; first branched ray, $1\frac{2}{3}$ in head. Caudal about equals head; pectoral, $1\frac{1}{6}$; ventral, $1\frac{2}{3}$. Color in alcohol with back, pale olive; sides and below pale with silvery-white tints. Hind edge of median caudal rays tinged with dusky; fins otherwise dull brownish and lower ones paler. Iris, whitish. Length, 105 mm.

It differs a little from Boulenger's account, likely due to age, in the snout slightly shorter than the eye. Compared with Mediterranean examples of *Liza aurata* (Risso) it agrees in the long pectoral and serrate preorbital, though the rakers are 35 + 46, in the adults 40 + 70, which shorter and though finely lanceolate, about three-fourths in young to two-thirds in adults in filaments. The Mediterranean species has scales with more obtuse apical denticles, lower or slightly less concealed. Both have 9 or 10 basal radii, reaching 12 or 13 in the Mediterranean, and always with very fine circuli.

LIZA GRANDISQUAMIS (Valenciennes).

Head, $3\frac{2}{3}$ to $3\frac{3}{4}$; depth, $3\frac{3}{4}$ to $3\frac{4}{5}$; D. IV—I, 8; A. III, 9; scales, 28 or 29 from shoulder to caudal base and 5 or 6 larger on latter; 10 scales transversely between soft dorsal and anal origins; 20 to 23 predorsal scales; snout, $3\frac{7}{8}$ to $4\frac{1}{2}$ in head; eye, 4 to $4\frac{3}{5}$; maxillary, $3\frac{7}{8}$ to 4; interorbital, $2\frac{1}{2}$ to $2\frac{7}{8}$. Elongate, well compressed, deepest at anal origin. Caudal peduncle well compressed; least depth, 1 to $1\frac{1}{8}$ its length or $2\frac{1}{5}$ in head. Head width, $1\frac{2}{3}$ to $1\frac{3}{4}$ its length. Snout broad; length about half its width. Eye advanced, before center in head length. Mouth broad. Teeth extremely minute, rudimentary, few above laterally, slightly more developed in smaller example. Maxillary end exposed little; reaches eye. Nostrils close, front one about midway in snout length. Interorbital broadly convex. Preorbital conspicuously denticulate. Rakers, 34 + 42, finely lanceolate, about two-thirds gill-filaments and latter $1\frac{1}{8}$ in eye. Scales with 8 to 11 basal striae. Cheek with four rows of scales. Ventral without axillary scaly flap and two scales between depressed spinous dorsal tip and soft dorsal origin. Small scales over base of front anal lobe and along front edge of soft dorsal. Spinous dorsal inserted about midway between front pupil edge and caudal base, midway between hind pupil edge and caudal base in smaller example; first spine, $1\frac{2}{3}$ in head. Soft dorsal inserted midway between spinous

dorsal origin and caudal base; first branched ray $1\frac{1}{2}$ in head, reaching caudal base in smaller example. Anal inserted about midway between ventral origin and caudal base, nearer latter in smaller example; $1\frac{1}{4}$ to $1\frac{2}{5}$ in head. Caudal large; eye-diameter longer than head, deeply forked, with lower lobe much longer in larger example; pectoral, $1\frac{1}{4}$ to $1\frac{1}{2}$; ventral, $1\frac{2}{5}$. Color in alcohol dull olive-brown above, paler to whitish below. Fins all pale brown. Two examples, 110 to 146 mm.

CARANX HIPPOS (Linnaeus).

Head, $2\frac{1}{8}$ to $3\frac{1}{4}$; depth, $2\frac{1}{8}$ to $2\frac{2}{5}$; D. VIII—I, 19 to 22; A. II—I, 15 to 18; scutes in lateral line, 29 to 36; snout, $3\frac{2}{3}$ to 4 in head measured from upper jaw tip; eye, 3 to $3\frac{2}{3}$; maxillary, $2\frac{1}{8}$ to $2\frac{1}{2}$; interorbital, 3 to $3\frac{1}{8}$; rakers, 6+15 or 16. Five examples, 50 to 104 mm.

An examination and comparison with American examples from Brazil, Santo Domingo, and New Jersey reveals no distinctions. The cycloid scales of all are with similar circuli and no basal striae.

EPINEPHELUS AENEUS (Geoffroy St. Hilaire).

Head, $2\frac{2}{3}$; depth, $3\frac{1}{8}$ to $3\frac{1}{2}$; D. X or XI, 15; A. III, 8; scales about 102 to 108 along and close above lateral line to caudal base and 15 to 18 more on latter; tubes, 71 to 73 in lateral line to caudal base and 13 to 20 on latter; 14 or 15 scales above lateral line to soft dorsal origin, 28 to 34 below; snout, 4 to $4\frac{2}{3}$ in head from upper jaw tip; eye, 4; maxillary, 2 to $2\frac{1}{8}$; interorbital, 7 to $7\frac{1}{4}$. Well compressed, back but little elevated. Caudal peduncle, length about $\frac{4}{5}$ to $\frac{7}{8}$ its least depth; latter $3\frac{1}{3}$ to $3\frac{1}{2}$ in total head length. Head width, $2\frac{2}{3}$ its length. Snout conic; length three-fourths its width. Eye advanced little beyond middle in head length; less so with age, and impinging on upper profile. Mouth large; lower jaw well protruded. Maxillary to or slightly beyond pupil, not quite to hind eye edge; expansion $1\frac{1}{2}$ to 2 in eye. Teeth in rather narrow bands. Two rows below in sides of mandible. Canines moderate, distinct pair in front above and another depressible inner pair. Moderate teeth in bands on vomer and palatines, in about three rows on latter. Interorbital slightly convex, with little median depression. Hind preopercle edge serrate, with cluster of four enlarged divergent spines at angle. Rakers vi, 2+8 to 11 v or vi, lanceolate, about $\frac{7}{8}$ of filaments and latter about 2 in eye. Pseudobranchiae equal gill-filaments. Muzzle and maxillary naked. Scales on head small and cycloid, with apical circuli coarser than marginal, and 2 or 3 short basal striae. About 22 rows of scales on cheek. Scales on trunk small, crowded or smaller along edges and over fin bases, mostly cycloid, circuli mostly even and with 4 or 5 basal radii. Only few scales along lower sides ctenoid, or with about 5 minute apical denticles. Tubes in

lateral line simple. Spinous dorsal begins over pectoral origin; third spine longest, or $2\frac{2}{3}$ to $2\frac{4}{5}$ in head. Soft dorsal origin midway between spinous dorsal origin and caudal base; fin rounded; fifth ray 2 to $2\frac{1}{5}$ in head. Spinous anal inserted about opposite last dorsal spine base; second anal spine longest, little longer than third, or $2\frac{2}{3}$ to $3\frac{2}{3}$ in head. Caudal rounded, $1\frac{1}{3}$ to $1\frac{1}{2}$ in head; pectoral, $1\frac{2}{3}$ to $1\frac{3}{4}$; ventral, $1\frac{5}{8}$ to $1\frac{7}{8}$, spine, $1\frac{2}{3}$ to 2 in fin.

Color in alcohol generally brown, under surface whitish, with five close-set pairs of slightly deeper brown cross-bands, mottled obscurely and sparsely with still deeper brown. Head with three pale lines, uppermost from hind eye edge to pectoral origin, median from lower hind eye edge toward lower pectoral basal edge, and lowest line from lower preorbital edge to breast. Fins pale brown; edges of dorsals deep brown, and median deep brown longitudinal band whole length of fin, though broken behind on soft fin as several blotches. Dark crossbars on trunk extend on dorsal bases as blotches. Anal with lower edge whitish and two pale brown longitudinal lines obliquely up behind. Caudal with several indistinct brown crossbars. Pectoral very pale. Ventral brown, front terminal edge whitish, and otherwise dusky terminally. Iris pale brown. Three examples, 89 to 95 mm.

LUTJANUS GUINEENSIS Bleeker.

Head, $2\frac{1}{3}$ to $2\frac{2}{3}$; depth, $2\frac{2}{5}$; D. X, 14; A. III, 8; scales 44 to 49 in lateral line to caudal base and 5 or 6 more on latter; 7 scales above lateral line to soft dorsal origin, 12 or 13 below; 12 to 16 predorsal scales; snout, $2\frac{9}{10}$ to $3\frac{2}{3}$ in head; eye, $3\frac{1}{3}$ to 4; maxillary, $2\frac{3}{5}$ to $2\frac{2}{3}$; interorbital, 5 to $5\frac{3}{4}$. Well compressed, back elevated. Cauda peduncle well compressed; least depth $\frac{3}{4}$ to $\frac{4}{5}$ its length. Head compressed, pointed, profiles straight and even, width $2\frac{2}{5}$ to $2\frac{1}{2}$ its length. Snout conic; width, $1\frac{1}{5}$ its length. Eye little ellipsoid; hind pupil edge little advanced to center in head length. Maxillary not quite to pupil. Mouth large, jaws even. Bands of villiform teeth in jaws, outer row of enlarged conic teeth and in front of upper pair of canines. Villiform teeth on vomer and palatines, in \uparrow -shaped patch on former. Tongue free, pointed, with elongate median patch of minute teeth. Front nostril small pore, three-fourths an eye-diameter before eye. Hind nostril twice as large and midway in space to eye. Interorbital broadly convex. Hind preopercle edge straight, finely serrate, with serrae little enlarged at angle, nine on lower edge forward. Least preorbital width about one-third to four-fifths of eye. Rakers, v I+8 iv, lanceolate, two in eye and about long as filaments. Pseudobranchiae equally large as filaments. Scales finely ctenoid, with radiating basal striae about 21. Above lateral line scales at first parallel, then rather abruptly oblique after

front part of spinous dorsal, though parallel on caudal peduncle above. Scales below lateral line in horizontal rows. Small scales on breast, much more so on vertical fin bases. Cheek with 7 rows of scales. Suprascapula denticulate marginally. Lateral line concurrent with dorsal profile; tubes inconspicuous. Spinous dorsal begins about over pectoral origin, fourth spine $2\frac{1}{3}$ to $2\frac{3}{4}$ in head. Soft dorsal inserted little nearer caudal base than spinous dorsal origin; fin rounded. Spinous anal begins little behind soft dorsal origin; second spine longest or $2\frac{2}{5}$ to $2\frac{5}{8}$ in head. Soft anal rounded; third ray $1\frac{3}{4}$ to $2\frac{1}{5}$ in head. Caudal with hind edge slightly emarginate. Pectoral, $1\frac{1}{3}$ to $1\frac{2}{3}$ in head; ventral, $1\frac{1}{3}$ to $1\frac{2}{3}$; and spine about half of fin; filamentous end of first ray nearly to vent; last slightly less than an eye-diameter before anal.

Color in alcohol brown on back and above; below paler to whitish. Each scale below lateral line with pale yellowish spot formed into lengthwise streaks. Below front nostril close to preorbital edge a bluish line, with narrow dark brown bordering lines, extending along lower eye edge back to hind preopercle angle. Iris pale yellowish. Fins brownish, ventral and anal whitish. Pectoral base brown. Three examples, 46 to 190 mm.

Bleeker shows ¹ the hind preopercle edge with a slight gash above its corner, hardly evident in my examples.

LUTJANUS MODESTUS Bleeker.

Head, $2\frac{2}{5}$ to $2\frac{3}{4}$; depth, $2\frac{2}{5}$ to $2\frac{7}{8}$; D. X, 13 or 14; A. III, 8; scales, 45 in lateral line to caudal base and 6 more on latter; 6 scales above lateral line to soft dorsal origin and 12 below; 14 or 15 predorsal scales; snout, $3\frac{1}{6}$ to $3\frac{1}{3}$ in head from upper jaw tip; eye, $3\frac{2}{5}$ to $4\frac{1}{3}$; maxillary, $2\frac{1}{3}$ to $2\frac{2}{5}$; interorbital, 5 to $5\frac{1}{4}$. Well compressed, back little elevated. Caudal peduncle well compressed, about long as deep. Head pointed, sides flattened; width, $2\frac{3}{4}$ its length. Snout conic, long as wide, or width $1\frac{1}{3}$ its length. Eye slightly ellipsoid; hind edge midway in its length, little backward in young. Maxillary beyond front of pupil or about two-fifths in eye. Mouth large, lower jaw slightly protruding. Bands of villiform teeth in jaws, outer row of enlarged conic canines; canines each side of lower jaw and pair in front of upper. Bands of villiform teeth on vomer and palatines, in \wedge -shaped patch on former. Tongue free, pointed, with elongate median area of minute teeth. Front nostril small pore advanced before eye three-fifths an eye-diameter, and hind nostril little larger midway between front one and eye. Interorbital broad, very slightly convex. Hind preopercle edge finely serrate, serrae little enlarged at angle, and with none on lower edge forward, though slight emargination just above corner. Least preorbital width about one-

¹ Nat. Verhandel. Holl. Maats. Wet. Haarlem, vol. 18 (P. Guinée), 1863, p. 46, pl. 10, fig. 1. Ashantee.

third to three-fifths of eye. Rakers, v, I+7 or 8, iv, lanceolate, about seven-eighths of filaments; latter $1\frac{3}{5}$ in eye. Pseudobranchiae nearly large as eye. Scales finely ctenoid, with about 20 basal striae. Scales above lateral line parallel, below in horizontal rows. Small scales on breast, more so on vertical fin bases. Cheek with 7 rows of scales. Suprascapula denticulate marginally. Lateral line concurrent with back, tubes inconspicuous. Spinous dorsal begins about over pectoral origin; fourth spine $2\frac{5}{8}$ in head. Soft dorsal inserted about midway between spinous dorsal origin and caudal base; eighth ray, $2\frac{2}{5}$ to 3 in head. Anal inserted slightly behind soft dorsal origin; second spine longest, or 3 to $3\frac{1}{4}$ in head. Soft anal rounded; third ray longest, or $2\frac{1}{8}$ to $2\frac{1}{6}$ in head. Hind caudal edge slightly emarginate. Pectoral, $1\frac{2}{5}$ to $1\frac{3}{5}$ in head; ventral, $1\frac{1}{2}$ to $1\frac{3}{5}$, but not quite to vent, which little nearer its tip than anal origin. Ventral spine about two-fifths to three-fifths in fin; first ray filamentous.

Color in alcohol brown on back above, paler to whitish below. No yellow spots on scales. From below hind nostril to lower eye edge narrow pale bluish line, bordered above and below with brown and not extended beyond eye. Fins brownish, ventral pale; lower front anal edge whitish and soft dorsal with two irregular rows of darker brown spots on membranes below middle. Iris pale. Two examples, 63 to 172 mm.

Bleeker's figure shows ¹ the scales above and below the lateral line in irregular rows, the maxillary nearly to eye center, no pale line below eye, and scales in lateral line branched.

POMADASIS JUBELINI (Cuvier).

Three examples, 103 to 175 mm.

POMADASIS BENNETTHI (Lowe).

One example (see page 283).

EUCINOSTOMUS MELANOPTERUS (Bleeker).

Head $2\frac{3}{5}$ to $3\frac{1}{5}$; depth, $2\frac{5}{8}$ to $3\frac{1}{4}$; D. IX, 10; A. III, 7; scales (pockets), 40 to 42 in lateral line to caudal base and 4 to 7 more on latter; 4 or 5 scales above lateral line, 8 or 9 below; snout, 3 to $3\frac{1}{4}$ in head from upper jaw tip; eye, $2\frac{3}{4}$ to $3\frac{1}{5}$; maxillary, $2\frac{3}{4}$ to 3; inter-orbital, $3\frac{1}{4}$ to $3\frac{2}{5}$. Form elongate, rather fusiform, compressed. Caudal peduncle compressed; least depth, $\frac{2}{3}$ to 1 in length. Head large, pointed, compressed; flat sides very slightly converge below; width, $2\frac{1}{8}$ to $2\frac{1}{3}$ in head. Snout conic, long as wide. Eye large, advanced, hind pupil edge but very slightly behind center in head

¹ Nat. Verhandel. Holl. Maats. Wet. Haarlem, vol. 18 (P. Guinée), 1863, p. 50, pl. 9, fig. 2. Ashantee.

length. Maxillary beyond front eye edge, not to pupil. Lips rather broad, firm. Teeth fine, in villiform bands in jaws. Nostrils together, close before upper front of eye. Interorbital level or only very slight median concavity. Preorbital and preopercle edges entire. Rakers, 5 or 6 + 8 or 9 short points, nearly one-third of filaments; latter $2\frac{1}{2}$ in eye. Pseudobranchiae little less than filaments. Premaxillary groove on top of head entirely scaleless, also maxillary, preorbital and snout tip. Hind part of premaxillary groove never entirely shut off by lateral intrusion of scales. Scales finely ciliated, with about five basal striae. Suprascapula entire. Lateral line concurrent with back to caudal base medially; simple tubes well exposed. Spinous dorsal inserted nearly midway between eye center and soft dorsal origin; slightly more advanced in young; third spine, $1\frac{4}{5}$ to $1\frac{9}{10}$ in head. Anal inserted little behind soft dorsal origin; third spine longest or trifle longer than second; $2\frac{3}{4}$ to $2\frac{4}{5}$ in head. Caudal well forked, trifle less than head; pectoral, $1\frac{1}{10}$ to $1\frac{2}{3}$; ventral, $1\frac{3}{5}$ to $1\frac{3}{4}$. Color in alcohol silvery-white generally; back pale brownish. Iris white. Fins all very pale brown; end of spinous dorsal lobe black with white bar below, and midway on fin still lower pale dusky horizontal streak. Seven examples, 47 to 108 mm.

Bleeker does not show ¹ the whitish band below the black apical blotch at front of spinous dorsal, nor mention it in his text. His example was 97 mm. long.

GALEOIDES DECACTYLUS (Bloch).

Two examples.

TILAPIA HEUDELOTI A. Dumeril.

Thirty-seven examples.

CHAETODON HOEFLERI Steindachner.

Head, $2\frac{1}{2}$ to $2\frac{3}{4}$; depth, $1\frac{2}{3}$ to $1\frac{3}{5}$; D. XI, 23; A. III, 18; scales, 43 to 45 from shoulder in nearly median series to caudal base medially; about 40 or 41 tubes in lateral line; 7 scales above lateral line to spinous dorsal origin, about 4 to soft dorsal origin, and 22 or 23 below to spinous anal origin; snout, 3 to $3\frac{3}{4}$ in head; eye, $2\frac{3}{4}$ to 3; maxillary, $3\frac{2}{3}$ to $3\frac{7}{8}$; interorbital, $3\frac{2}{5}$ to $3\frac{1}{2}$. Back well elevated; body strongly compressed; predorsal slightly trenchant. Caudal peduncle strongly compressed; length about three-fifths its least depth and latter, $2\frac{7}{8}$ in head. Head width half its length. Snout conic, length about seven-eighths its width. Eye elevated, advanced, or hind pupil edge about midway in head length. Small mouth terminal, closed jaws even. Maxillary largely below preorbital, to hind nostril and expansion $1\frac{2}{3}$ in horizontal pupil. Teeth in brush-like bands. Lips rather thin, moderate. Nostrils close before eye

¹ Nat. Verhandel. Holl. Maats. Wet. Haarlem, vol. 18 (P. Guinée), 1863, p. 44, pl. 8, fig. 1. Guinea.

above, front one little lower or about three-fifths of pupil length before eye. Interorbital broadly convex. Rakers, 3 + 9 or 10 weak points, about 4 in filaments and latter $1\frac{2}{3}$ in eye. Scales ctenoid, with about 14 basal striae, in oblique rows above and below lateral line, become much smaller and greatly crowded over rayed vertical fins. Cheeks with five rows of scales. Lateral line greatly arched; ends close below last dorsal rays. Dorsal with stronger and slightly longer spines in front; fifth spine, $1\frac{1}{2}$ to $1\frac{4}{5}$ in head; fin edge notched. Soft dorsal rounded, fifth ray $1\frac{5}{6}$ to 2 in head. Spinous anal inserted about midway between hind preopercle edge and caudal base; second spine 2 in head, and fifth ray about $1\frac{3}{4}$ to 2. Caudal convex behind, $1\frac{2}{5}$ to $1\frac{1}{2}$ in head; pectoral, $1\frac{1}{4}$; ventral spine, $1\frac{3}{4}$ to $1\frac{7}{8}$.

Color in alcohol pale brownish generally, lower or under surfaces pale or whitish. Deep brown broad band begins just below and before spinous dorsal origin, but not meeting its fellow on predorsal, extends forward to eye, which it intersects, leaving hind portion of iris whitish. This also continued below over cheek to front branchiostegals. Second broad band begins on spinous dorsal, including third to fifth spines, extends down, including pectoral base, hind edge of opercle broadly to ventral base, though about half its width before these fins so its fellow converges. Third broad band extends from last two dorsal spines basally and front dorsal rays basally, down toward front of soft anal, narrowed and paler below, but quite dark and conspicuous at its origin above. Dark transverse band across caudal peduncle, followed by narrow white border. All dark bands noted with rather narrow pale borders. Edges of soft dorsal and anal dusky. Fins all pale, and caudal base with dull brownish crescent transversely. Each scale on breast and along side of abdomen between dark bands with small pale spot. Two examples, 63 to 66 mm.

Compared with examples of *Chaetodon striatus* (Linnaeus) from Delaware Bay and the West Indies, 68 to 136 mm. long, one finds a constant difference in coloration. In *C. hoeferi* the second broad dark band extends more obliquely forward to include hind portion of opercle entirely, besides pectoral and ventral bases likewise; third band deeply black above and not joined by dark band on basal portion of soft dorsal. Due to youth, likely, my examples of *C. hoeferi* differ somewhat from Steindachner's figure, as dark edges on soft dorsal and anal are broader; second dark band extends more forward to include more of opercle besides ventral base and area well before it.

HAPATUS HEPATUS (Linnaeus).

Head, $3\frac{1}{5}$; depth, $1\frac{3}{4}$; D. IX, 26; A. III, 24; snout, $1\frac{4}{5}$ in head; eye, 3; maxillary, 4; interorbital, $3\frac{1}{3}$; caudal spine about 2 in eye. Caudal slightly lunate, truncate when expanded. Color in alcohol

largely uniform brownish, dorsals, anals, ventrals, and median caudal rays terminally dusky to blackish-brown, though hind caudal edge narrowly whitish. Pectoral pale brown. Iris whitish. Length, 77 mm.

Agrees with examples from Colon, Panama, upon comparison.

MAPO SOPORATOR (Valenciennes).

Five examples.

PERIOPHTHALMUS BARBARUS (Linnaeus).

Twelve examples, 56 to 173 mm. Adults usually with trunk of uniform color, young with 5 or 6 dark brown blotches along side, and caudal with about 9 narrow dark brown crossbars. In adults lower caudal edge variously broadly white, also upper edge occasionally whitish.

CITHARICHTHYS SPILOPTERUS Günther.

Three small examples, 65 to 72 mm.

7. KAMERUN.

A small collection of fishes made by the Rev. R. H. Nassau, at Great Batanga, and sent to Princeton University, has been studied in this connection. The collection is now in the museum of Princeton University, and to the officers of the same I am indebted for the opportunity of its examination. A list of the fishes was recently given over my name.¹ The first account of the Kamerun fishes is Peters list of the Bucholz collection,² though he describes the interesting *Pantodon* about the same time.³ Since then the only accounts are by Ehrenbaum⁴ and Pietschmann,⁵ who note but few species.

GALEICHTHYS LATISCUTATUS (Günther).

Head $3\frac{2}{3}$; depth, $4\frac{1}{4}$; D. I, 7; A. iv, 14; snout, $2\frac{3}{8}$ in head measured from upper jaw tip; eye, $6\frac{2}{3}$; mouth width, $2\frac{1}{4}$; interorbital, $2\frac{1}{5}$; first branched dorsal ray, $1\frac{1}{5}$; least depth of caudal peduncle, 4; lower caudal lobe, $1\frac{2}{5}$; pectoral, $1\frac{1}{5}$; ventral, $1\frac{1}{2}$.

Body compressed, flattened below in front. Caudal peduncle compressed. Head wide, depressed, upper profile evenly though slightly convex. Snout broad, length $1\frac{3}{4}$ its width. Eye moderate, advanced, hind edge midway in head length. Mouth broad, slightly inferior. Teeth in wide bands in jaws, fine, ends of bands rounded. Palatine teeth in two large patches, fine, and each patch of rounded design. Maxillary barbel nearly to end of pectoral ray; outer mental to pectoral ray base and inner mental $1\frac{1}{2}$ to pectoral base. Nostrils large,

¹ Copeia, No. 45, June 24, 1917, p. 53.

² Monatsber. Ak. Wiss. Berlin, 1876, pp. 244-252, pl. 1.

³ Idem, pp. 195-200

⁴ Ueber Fische von Westafrika besonders Kamerun. Fischerboten, vol. 5, 1913, pp. 308, 358, 398, 506.

⁵ Jahrb. Nassauisch. Ver. Naturk. (Weisbaden), vol. 66, 1913, pp. 171-187.

close, near snout edge, hind one with well-developed flap, about an eye-diameter directly before eye. Fontanel on head narrow, reaches occipital buckler. Bones of head, occipital buckler, and front of dorsal spine strongly rugose. Rakers about 4+8, lanceolate, little shorter than filaments. Lateral line complete, distinctly arched at first. Opercles moderately striate. Humeral process about long as snout, with few striae. Dorsal origin slightly behind pectoral center. Adipose fin rounded, about long as snout. Caudal well forked, lobes about equal. Anal inserted little nearer caudal base than dorsal origin, front rays little shorter than last. Pectoral reaches seven-eighths to ventral, which inserted midway between caudal base and hind nostril and long fin reaches first fifth of anal.

Color in alcohol brown above, whitish on belly and under surfaces. Dorsal, pectoral, ventral, and anal with dusky on median terminal portions. Maxillary barbel brownish, other barbels pale. Iris brownish. One example, 267 mm.

The above differs from the Sierra Leone specimens in its much longer barbels, depressed dorsal $1\frac{2}{3}$ to adipose fin and longer pectoral, which reaches near ventral.

TYLOSURUS CHORAM (Forskål).

Head (damaged), $3\frac{1}{3}$; depth, $12\frac{1}{2}$ in trunk, excluding head and caudal fin; D. II, 20?; A. II, 20; P. I, 13; scales about 385 to caudal base, counted in median lateral row from gill-opening; 18 scales above lateral line to dorsal origin, 5 below; about 310 predorsal scales; eye, $2\frac{1}{8}$ in postocular; interorbital, $1\frac{7}{8}$.

Body moderately compressed. Caudal peduncle about wide as least depth and keel slightly developed each side. Head convergent below, broad above, width $1\frac{1}{2}$ in postocular region. Eye large, ellipsoid. Jaws long, slender, not completely closing so base of upper leaves a distinct open gape. Teeth of single row enlarged and erect canines in each jaw, and surfaces all about externally with small denticles or asperities. Tongue small, slender, end free. Maxillary largely concealed, reaches first third in eye. Nasal cavity large, longest diameter equals pupil. Interorbital slightly depressed medially. Cheek little wider than opercle. No rakers. Scales small, narrowly imbricated, with basal and apical striae distinct, not convergent or joined over median vertical axis. Head naked, except 22 rows of scales across cheek. Lateral line low, even over caudal base. Dorsal inserted little behind anal origin, lobe about $1\frac{1}{4}$ in postocular space, and hind rays at least twice depth of caudal peduncle, though not longer than median rays. Anal lobe in front like dorsal, equals postocular, other rays lower than dorsal. Caudal damaged, lower lobe evidently longer. Pectoral about equals postocular, ventral $1\frac{1}{4}$.

Color in alcohol dark brown above, paler to whitish below, with silvery reflection. Along side from shoulder to caudal base pale leaden band, below dorsal apparently wide as pupil, but ill defined. Iris pale. Fins brownish; dorsal, pectoral, and caudal darker, and dorsal nearly blackish behind. Length, 545 mm. (beak and caudal damaged).

Compared with an example I identified as *Tylosurus crocodilus* (Le Sueur) from Sumatra,¹ about 622 mm. long, the scale structure is similar, and no specific characters of strong contrast noted. In the Sumatra specimen the scales are larger, about 315 in a lateral series to the caudal base, less narrowly imbricated, and the median and last dorsal rays lower or at least not twice least depth of caudal peduncle. The Sumatra fish has larger predorsal scales, about 290. Peters records *Belone caribaea* Le Sueur from Victoria,² which possibly may be the present species. It apparently differs in having 210 predorsal scales

CARANX AFRICANUS Steindachner.

Head, $3\frac{3}{8}$; depth, $2\frac{3}{8}$; D. VIII—I, 21; A. II—I, 18; lateral line of 32 tubes and 44 scutes, curved portion twice that of straight portion; snout, $3\frac{1}{8}$ in head measured from upper jaw tip; eye, $3\frac{7}{8}$; maxillary, $2\frac{2}{5}$; interorbital, $3\frac{1}{8}$; rakers, 12+28, lanceolate, $1\frac{1}{2}$ in eye. Adipose eyelid moderate. Breast naked. Dorsal filament slightly longer than pectoral. Color in alcohol brown above, white below. Outer dorsal and anal membranes of rayed fins brownish, others pale. Length, 254 mm.

VOMER SETAPINNIS (Mitchill).

One example, 220 mm. Depth, 2. Rakers, 6+31.

POMADASIS JUBELINI (Cuvier).

Head, $2\frac{2}{3}$; depth, $2\frac{2}{3}$; D. XI, I, 14; A. III, 9; scales, 51 in lateral line to caudal base and 13 more on latter; 5 scales above lateral line, 12 below; snout, $2\frac{4}{5}$ in head; eye, $4\frac{1}{4}$; maxillary, $3\frac{2}{5}$; interorbital, $4\frac{1}{4}$.

Body compressed, back well arched, and profile evenly convex over ventral base. Caudal peduncle compressed, least depth $3\frac{3}{4}$ in head. Head width $2\frac{1}{4}$ its length. Snout conic, width, $1\frac{1}{2}$ its length. Eye close to upper profile, slightly advanced. Mouth small, nearly horizontal; lower jaw shorter. Maxillary to hind nostril. Lips fleshy. Teeth fine, in bands in jaws; outer upper slightly enlarged; none on vomer. Symphysis with pair of pores and larger median pit little back. Nostrils together; front one large, close to middle of front eye rim. Interorbital slightly convex. Hind preopercle edge undulate, sparsely denticulate and about 5 denticles around corner more prominent. Rakers, 1, 6+13, lanceolate, 3 in eye. Head scaly.

¹ Journ. Acad. Nat. Sci. Phila., ser. 2, vol. 12, 1904, p. 501, pl. 11, upper fig.

² Monatsb. Ak. Wiss. Berlin, 1876, p. 250.

except snout, jaws, and chin. About 6 rows of scales on cheek. Scales finely ctenoid, basal striae about 11. Lateral line slightly convex; slopes down till midway at caudal base. Dorsals and anals with developed basal scaly sheaths. Caudal base scaly. Rays of soft dorsal and anal scaleless. Above lateral line scales in oblique rows to front part of spinous dorsal, then parallel with lateral line, and rows below lateral line horizontal. Fourth dorsal spine longest, little less than half of head; fin well separated from soft dorsal; first ray, $2\frac{3}{4}$ in head. Second anal spine much longest, $1\frac{1}{2}$ in head, not quite reaching caudal base; third spine much shorter and more slender, or about long as first ray; both $2\frac{1}{4}$ in head. Caudal with hind edge concave; fin, $1\frac{1}{2}$ in head; pectoral, 1; ventral, $1\frac{1}{2}$.

Color in alcohol brownish, little paler below. Below dorsals on back and sides down to pectoral, with deep brown spots, variable, though largely in horizontal rows, or about four or five rows equally above and below lateral line. Blackish blotch at hind opercle edge little smaller than eye. Outer membranes of spinous dorsal with obscure dusky blotches, and subbasal band of brown spots on membranes of soft dorsal; outer portion of fin brownish. Hind caudal edge tinged with dusky. Length, 230 mm.

The three Ashantee examples listed previously all agree in the characteristic long second anal spine extending beyond any of the anal rays or other spines. They show: head, $2\frac{3}{4}$ to $2\frac{4}{5}$; depth, $2\frac{2}{3}$ to $2\frac{7}{8}$; D. X or XI, 16; A. III, 8 to 10; scales, 46 to 52 in lateral line to caudal base and 8 to 12 more on latter; 5 or 6 scales above lateral line, 11 to 14 below; snout, $3\frac{1}{2}$ in head; eye, $3\frac{2}{5}$ to $3\frac{3}{4}$; maxillary, $3\frac{2}{5}$ to $3\frac{3}{5}$; interorbital, $4\frac{1}{5}$ to $4\frac{1}{3}$; length, 115 to 175 mm.

PSEUDOTOLITHUS TYPUS Bleeker.

Head, $3\frac{1}{2}$; depth, $4\frac{2}{3}$; D. IX, I, 29; A. II, 7; scales 50 in lateral line to caudal base and 22 more on caudal medially; 7 scales above lateral line to soft dorsal and 7 below to anal; snout, $4\frac{1}{2}$ in head, measured from upper jaw tip; eye, $7\frac{2}{3}$; maxillary, $2\frac{1}{3}$; interorbital, $8\frac{1}{5}$.

Body compressed, deepest at pectoral end. Caudal peduncle length about two-thirds least depth; latter $3\frac{2}{5}$ in head. Head width, $2\frac{1}{8}$ its length; upper profile concave to snout. Latter convex; length two-thirds its width. Eye small, faces largely upward; center slightly before first third in head. Mouth large, well inclined; lower jaw well protruded. Maxillary to hind eye edge. Lips thin, fleshy. Teeth fine, in narrow bands and outer row in each enlarged, though upper much larger. In front above one or two slightly enlarged canines. Hind nostril very close before eye and larger than front, which less than half an eye-diameter before front eye edge. Interorbital slightly convex. Preopercle edge obsoletely denticulate.

Suprascapula flexible. Rakers iv 3+13 iv, lanceolate, slightly less than eye. Scales finely ctenoid, with 20 to 24 radiating basal striae, in oblique rows broken by lateral line, and largest scales on costal region. Head, scaly, except muzzle, caudal base scaly. Lateral line complete, mostly concurrent with dorsal profile and midway behind to caudal base. Dorsal origin little behind ventral origin; first spine very short and third spine longest or $2\frac{1}{4}$ in head. Soft dorsal long, uniformly high, first ray, 3 in head. Anal base opposite middle of soft dorsal base, third anal ray, $2\frac{1}{4}$. Caudal pointed medially behind, $1\frac{1}{4}$ in head, pectoral, $1\frac{1}{2}$, ventral, $1\frac{3}{8}$.

Color in alcohol brownish above, whitish below. Fins pale brownish; ventral and anal paler. Dusky shade on opercle. Each row of scales on back and upper surface with slightly darker oblique streaks. Length, 292 mm.

PERIOPHTHALMUS BARBARUS (Linnaeus).

Thirteen examples, 78 to 152 mm.

8. GABUN, FRENCH KONGO.

The first enumeration of Gabun fishes was made by Duméril, in his paper already referred to under the Cape de Verde Islands. Günther describes a number of new species from the Gabun.¹ Sauvage first notes the fishes of the Ogôoue,² later elaborated in his "Etude sur la Faune Ichthyologique de l'Ogôoue,"³ and, finally, his "Francville, Haute Ogôoue."⁴ Boulenger describes a new siluroid⁵ and a new cichlid.⁶ More recently numerous papers by Pellegrin have appeared.⁷ The material on which the present account is based is the old collection made by P. B. Du Chaillu received in 1854, and a small lot obtained a few years ago by the late Rev. R. H. Nassau. The Du Chaillu collection is contained in the Academy of Natural Sciences of Philadelphia, while those received from Nassau are in the University of Pennsylvania. The former are indicated by D. and the latter by N.

¹ Ann. Mag. Nat. London, ser. 3, vol. 20, 1867, pp. 110-117; ser. 6, vol. 18, 1896, pp. 262-263.

² Bull. Soc. Philom. Paris (7) vol. 3, 1879, pp. 90-103.

³ Nouv. Arch. Mus. Paris (2) vol. 3, 1880, pp. 1-56, pls. 1-3.

⁴ Bull. Soc. Zool. France, vol. 9, 1884, pp. 193-198.

⁵ Ann. Mag. Nat. London (7) vol. 2, 1898, p. 415.

⁶ Idem (7) vol. 8, 1901, pp. 114-116.

⁷ Bull. Mus. Hist. Nat. Paris, vol. 6, 1900, pp. 98-101, 177-182, 384-354; vol. 7, 1901, pp. 328-332; vol. 10, 1904, pp. 221-223; vol. 12, 1906, pp. 467-471; vol. 14, 1908, pp. 347-349; vol. 15, 1909, pp. 66-68.

Bull. Soc. Philom. Paris (9) vol. 9, 1907, pp. 17-42, pl. 2 figs.; (9) vol. 11, 1909, pp. 184-190; (1) vol. 10, 1909, pp. 45-53; (3) vol. 10, 1911, pp. 276-277.

Bull. Soc. Zool. France, vol. 36, 1911, pp. 180-181; vol. 38, 1913, pp. 272-275; vol. 39, 1914, pp. 297-298.

Compt. Rend. Acad. Sci. Paris, vol. 156, 1913, pp. 1488-1489.

Compt. Rend. Assoc. Franc. Adv. Sci., 1915, 43 sess., pp. 500-505.

TORPEDO NARKE (Risso).

One example, 223 mm. N. Though largely faded the back uniform brownish, and under outer borders of pectorals and ventrals broadly brownish. Spiracle with obsolete papillae along edge. Hind caudal edge slightly convex.

ETHMALOSA DORSALIS (Valenciennes).

Two small examples. D. Also one in poor condition, small. N.

CLARIAS DUCHAILLUI Fowler.

Clarias duchailui FOWLER, Proc. Acad. Nat. Sci. Phila., 1915, p. 226, fig. 7. Gabun.

The types, seven examples, examined. D.

FUNDULUS NISORIUS Cope.

Fundulus nisorius COPE, Trans. Amer. Philos. Soc., vol. 11, 1870, p. 456 Gabun.—FOWLER, Proc. Acad. Nat. Sci. Phila., 1916, p. 417 (types).

The types, 18 examples, examined. D.

APLOCHEILUS SEXFASCIATUS (Gill).

Epiplatys sexfasciatus GILL, Proc. Acad. Nat. Sci. Phila., 1862, p. 136. Gabun.

The types, 13 examples, examined. D.

FODIATOR ACUTUS (Valenciennes).

One example. N.

HYPORHAMPHUS SCHLEGELI (Bleeker).

One example in very poor condition, about 110 mm. long. N. It has ventral origin midway between pectoral origin and caudal base. Head from upper jaw tip about two-thirds of beak. Caudal peduncle wide as vertical pupil diameter. A. II, 13. A broad silvery-white band, especially along caudal peduncle side nearly wide as vertical pupil diameter.

Bleeker's *Hemiramphus schlegeli*¹ has priority over *Hemiramphus calabaricus* Günther,² as long ago pointed out by Günther himself.³

SYNGNATHUS PELLEGRINI, new species.

Head, $3\frac{1}{2}$ to vent; D. 38; rings, 18+38; snout, $2\frac{1}{4}$ in head from upper jaw tip; eye, $2\frac{1}{4}$ in snout. Body slender, slightly wider than deep, greatly elongated; combined head and trunk $2\frac{3}{5}$ in tail. Body ridges distinct, without spines; that on upper lateral edge not con-

¹ Nat. Verhandel. Holl. Maats. Wet. Haarlem, vol. 18, 1863, No. 2, p. 120, pl. 25, fig. 1. *Ora aurifer*, Guinea.

² Cat. Fish. Brit. Mus., vol. 6, 1866, p. 266.

³ Ann. Mag. Nat. London, ser. 3, vol. 18, 1866, p. 427.

tinuous with that on tail. Median lateral ridge of trunk not continuous with upper lateral ridge of tail. Head width one-fourth its length. Snout with least depth little nearer its tip than eye. Latter ellipsoid, front pupil edge nearly midway in head length. Lower jaw protrudes. Interorbital narrow or about half of eye-diameter, deeply concave. Opercle with short ridge, little inclined from horizontal, extends in front for about first fourth. Upper postocular ridge not quite to occiput. Median occipital ridge, well developed, extends back little beyond pectoral base or well over first body ring. Greater part of dorsal fin on tail, or base on 4 trunk and 6 caudal rings. Pectoral, $4\frac{1}{2}$ in head; caudal, 3. Color in alcohol largely uniform brownish; belly and lower surfaces of head and tail mostly paler. Iris slaty. No markings. Length, 113 mm.

Type.—No. 975, A.N.S.P. Gabun, West Africa. P. B. Du Chaillu.

Also Nos. 976 to 978, A.N.S.P., paratypes. These show: head, 3 to $3\frac{1}{2}$ to vent; D. 35 to 37; rings, 18 to 20 + 37 or 38; snout, $2\frac{1}{10}$ to



FIG. 11.—SYNGNATHUS PELLEGRINI.

$2\frac{1}{2}$ in head from upper jaw tip; eye, 2 to $2\frac{1}{2}$ in snout; length, 88 to 105 mm.

This species appears unique in its advanced dorsal.

(For Dr. Jacques Pellegrin of the Muséum national d'histoire naturelle, Paris, author of many excellent papers on African fishes, in slight recognition of his studies on Gabun fishes.)

ISCHNOMEMBRAS GABUNENSIS Fowler.

Ischnomembras gabunensis FOWLER, Proc. Acad. Nat. Sci. Phila., 1904, p. 73, pl. 42. Gabun River.

Two examples, the types, examined. D. One now in the Field Museum at Chicago.

LIZA RAMADA (Risso).

Liza alosoides FOWLER, Proc. Acad. Nat. Sci. Phila., 1903, p. 746, pl. 45. Gabun River.

Seven examples, the types of *L. alosoides* Fowler, examined. D.

Boulenger's suggestion¹ of the identity of *L. alosoides* with the present species is correct. A comparison of these types with the Ashantee material noticed previously in these pages shows they are nothing but young. They have the gill-rakers 22 + 28, but little less than filaments, or $1\frac{1}{4}$ in eye. The basal radii of the scales vary 6 to 9.

¹ Cat. Fresh-W. Fish. Africa, vol. 4, 1916, p. 84

HOLOCENTRUS ASCENSIONIS (Osbeck).

Four adult examples. N.

SPARUS AURATUS Linnaeus.

Head, $2\frac{4}{5}$; depth, $2\frac{1}{2}$; D. XII, 12; A. III, 11; scales, 48 in lateral line to caudal base and about 5 (?) more on latter; 5 scales above lateral line, 15 below; snout, $3\frac{1}{8}$ in head; eye, $2\frac{3}{4}$; maxillary, 3; interorbital, $3\frac{3}{4}$. Front teeth conic, some canine-like, and upper molars in two rows. Length, 50 mm. D.

EUCINGSTOMUS MELANOPTERUS (Bleeker).

One small example, 36 mm. long, in poor condition. Head, $2\frac{7}{8}$; depth, 3; D. IX, 10; A. III, 7. Premaxillary groove naked. D.

PSEUDUPENEUS PRAYENSIS (Cuvier).

Head, 3; depth, 3; D. VIII-I, 8; A. II, 6; scales, 28 in lateral line to caudal base and two more on latter; 2 scales above lateral line and 4 below; snout, $2\frac{1}{8}$ in head; eye, $3\frac{2}{3}$; maxillary, 3; interorbital, $4\frac{1}{8}$. Rakers, 4+19. Maxillary not quite to eye. Color in alcohol faded brownish. Length, 103 mm. N.

SPHEROIDES SPENGLERI (Bloch).

One, 30 mm. long (without caudal, which lost), and very poorly preserved. It has the rough area above beginning between the eyes and extending over predorsal about half way to dorsal fin. Spines larger and much more numerous over inflatable belly. N.

TETRODON PUSTULATUS Murray.

Head, $2\frac{4}{5}$; depth, $2\frac{1}{8}$; D. II, 9; A. II, 7; snout, $2\frac{1}{2}$ in head; eye, $3\frac{1}{2}$; interorbital, $2\frac{1}{8}$. Trunk compressed, also caudal peduncle, which latter with least depth about $1\frac{1}{2}$ its length or 3 in head. Head broad above; width, $1\frac{2}{3}$ its length. Snout obtuse, length about two-thirds its width. Eye large, impinging on upper profile, hind pupil edge about midway in head length. Teeth large, normal. Lips wide, fleshy. Nostril bifid tentacle close before eye, tentacle about half pupil length. Interorbital broad, level. Gill-opening about long as eye. Skin largely smooth; only inflatable belly with large and mainly concealed spines. Side and upper surface of head with many, mostly longitudinal, wrinkles. Back and upper part of sides with many fine wrinkles, mostly longitudinal. Dorsal inserted nearer caudal base than gill-opening; first branched ray 2 in head. Anal inserted slightly behind dorsal origin; first branched ray about 2 in head. Caudal truncate, $1\frac{1}{8}$ in head; pectoral, 2. Color in alcohol brown, paler to creamy-white below. Iris and fins pale brownish, with dorsal and caudal ends pale dusky. Length 50 mm. N.

SYACIUM GUINEENSIS (Bleeker).

Head, $3\frac{1}{4}$ to $3\frac{3}{4}$; depth, $2\frac{1}{8}$ to $2\frac{2}{5}$; D. 79 to 87; A. 60 to 64; scales, 43 or 44 (pockets) in lateral line to caudal base; snout 4 to $4\frac{1}{8}$ in head measured from upper jaw tip; lower eye, 4 to $4\frac{1}{8}$; maxillary, $2\frac{1}{8}$ to $2\frac{2}{5}$; caudal, $1\frac{1}{4}$. Contour rather ellipsoid. Least depth of caudal peduncle, $2\frac{1}{8}$ in total head length. Head width about $3\frac{1}{2}$ its length. Upper orbital socket little larger, slightly backward, and eyes very close or only divided by thin bony partition. Maxillary almost vertical. Lower jaw slightly protrudes. Teeth uniserial, simple, conic, larger forward and on blind side. No teeth on mouth roof. Preopercle edge entire. Rakers, 5 + 15, lanceolate, about half of filaments and latter $1\frac{1}{2}$ in eye. Scales all fallen, apparently 4 or 5 rows on cheek. Lateral line complete, median, nearly straight from shoulder to caudal base medially. Color in alcohol, on left side, brownish, and right side paler. Iris pale slaty. Length of three examples, 45 (?) to 70 mm. N.

Although Rochebrune ¹ credits *Rhombus senegalensis* Kaup to Wiegmann (Arch., 1855), I can not find any reference to it in the volume for that year or in the register of names from 1835-1859.

SOLEA LASCARIS (Risso).

Head, $4\frac{3}{4}$; depth, $2\frac{1}{2}$; D. 80; A. 66; scales, about 115 (?) to caudal base in lateral line; about 24 scales above lateral line and 40 below; snout to lower eye, $2\frac{3}{4}$ in head, measured from upper jaw tip; mouth cleft, $3\frac{1}{2}$; lower eye, $1\frac{3}{8}$ in snout from its front edge; interorbital about equals vertical eye-diameter. Upper jaw with short lobe overhanging lower. Nostril on blind side about long as vertical eye-diameter, broadly bordered as rosette-like ring of papillae. Colored pectoral about $1\frac{3}{4}$ in head, pale pectoral about $2\frac{1}{8}$; caudal $1\frac{2}{5}$. Color in alcohol, right side uniform brownish. Pectoral with black blotch about middle. Iris slaty. Left side whitish. Length, 78 mm. N.

CYNOGLOSSUS GOREENSIS Steindachner.

Head, 5; depth, $4\frac{1}{4}$; D. 126; A. 89; scales, about 30 + 100 (?) in entire lateral line to caudal base; 17 scales above median lateral line at widest part of body to upper lateral line, 28 below; snout to lower eye, $2\frac{5}{8}$ in head measured from upper jaw tip; mouth cleft, $3\frac{3}{8}$. Color in alcohol with left side uniform brown, right side whitish. Length, 130 mm. N.

9. ANGOLA.

Günther first describes ² new Angola fishes, Osorio has given a list of the marine species, ³ Regan describes a new *Dentex*, ⁴ and, finally,

¹ Faune Senegamb., 1883-1885, p. 115.

² Ann. Mag. Nat. London, ser. 4, vol. 12, 1873, pp. 142-144.

³ Journ. Sci. Lisboa, ser. 2, vol. 2, 1890, pp. 50-60; ser. 2, vol. 3, 1893, p. 128.

⁴ Ann. Mag. Nat. London, ser. 7, vol. 15, 1905, p. 325.

Boulenger has reported the extensive Ansorge collections.¹ The Eclipse expedition obtained material at Loando (São Paulo de Loanda); also the Quanza River, some at Cunga.

SARDINELLA AURITA (Valenciennes).

Head, $3\frac{1}{3}$ to $3\frac{3}{4}$; depth, $3\frac{1}{3}$ to $3\frac{4}{5}$; D. III, 15, rarely 14 or 16; A. II, 15 to 18, occasionally 19; scales 42 to 47 in median lateral count to caudal base and 4 to 6 more on latter; 14 scales transversely, seldom 13 or 15; ventral scutes, 17, sometimes 18 or 19+14, sometimes 15 or 16; snout, $3\frac{1}{4}$ to $3\frac{7}{8}$ in head, measured from upper jaw tip; eye, $3\frac{3}{8}$ to $4\frac{4}{5}$; maxillary, $2\frac{1}{4}$ to $2\frac{3}{4}$; interorbital, $3\frac{5}{8}$ to $4\frac{1}{3}$. Head width about half its length. Snout with preorbital adipose-like, width $1\frac{1}{8}$ to $1\frac{1}{4}$ its length. Eye with broad adipose-lids; hind pupil edge about midway in head length. Maxillary to pupil, or about first third in eye; expansion, $1\frac{1}{2}$ to $1\frac{3}{4}$. Median patch of fine teeth on tongue. Interorbital very slightly convex, or level medially. Rakers about 95 to 130+130 to 175, very fine or slender; about long as snout and filaments about three-fourths to seven-eighths of rakers. Color in alcohol with back dull olive-slaty; sides of head and trunk pale brassy. Fins brownish; pectoral with upper rays whitish, and caudal tips usually dusky to blackish; also origin and first two simple dorsal rays blackish. No dark spots on opercle edge. End of snout and mandible brownish. Length, 222 to 267 mm. Eight examples from Loando, besides two previously mentioned from Cape de Verde Islands.

The species exhibits variation in many respects, as in some examples the pectoral reaches three-fourths to ventral; in others two-thirds; striae on cheek numerous or sometimes obsolete; ventral longer or shorter, etc.

ETHMALOSA DORSALIS (Valenciennes).

Head, $2\frac{3}{4}$ to 3; depth, $2\frac{2}{5}$ to $2\frac{4}{5}$; D. III, 13 or 14, occasionally 15; A. II, 19, occasionally 17 or 18; scales in median lateral series from shoulder to caudal base, 37 to 42, and 4 or 5 more on latter; scales transversely to ventral keel 18, vary sometimes 16 to 19; ventral scutes, 16, sometimes 17+11 to 13; snout, 4 to $4\frac{3}{8}$ in head; eyes 5 to $5\frac{2}{5}$; maxillary, $2\frac{2}{5}$ to $2\frac{3}{5}$; interorbital, $3\frac{1}{5}$ to 4. Five example, from Loando and two from Sierra Leone at Freetown previously listed. Length, 286 to 323 mm.

The young Gabun examples have rakers about 38+90, while in the adults they are about 58+125.

CLARIAS GARIEPINUS (Burchell).

Head, $3\frac{7}{8}$ to $4\frac{3}{5}$; depth, $6\frac{2}{5}$ to 8; D. 66 to 73; A. 50 to 61; snout, $2\frac{3}{4}$ to $3\frac{1}{4}$ in head, measured to hind edge of gill-opening; mouth

¹ Ann. Mag. Nat. London, ser. 7, vol. 15, 1905, pp. 457-459; ser. 7, vol. 17, 1906, pp. 110-112; ser. 7, vol. 18, 1906, pp. 347-348; ser. 7, vol. 20, 1907, pp. 108-109; ser. 8, vol. 6, 1910, pp. 537-561.

width, $2\frac{2}{3}$ to $2\frac{1}{2}$; interorbital, 2 to $2\frac{1}{4}$; eye, $4\frac{1}{2}$ to $5\frac{1}{3}$ in interorbital. Body compressed, deepest at dorsal origin. Head width, $1\frac{1}{4}$ to $1\frac{1}{3}$ its length, coarsely granular above, more so in half-grown. Snout wide, depressed; length about two-fifths to one-half its width. Eye small, at first third in head, or hind edge at first third in half-grown. Mouth broad, with fleshy papillose lips; under jaw shorter. Broad bands of villiform teeth in jaws and on vomer; band of upper jaw about three-fourths width of vomerine band. Nasal barbel about three-fifths to gill-opening; maxillary to middle of pectoral spine or four-fifths in half-grown; outer mental to pectoral origin and inner about two-thirds in head length. Width of long frontal, one-fourth its length; one-third in half-grown or $3\frac{1}{4}$ to $3\frac{1}{2}$ times occipital fontanel. Occipital process triangular; length about two-thirds its base. Rakers about 15+76; lanceolate, fine, slightly longer than filaments or equal eye. Space between dorsal and caudal $1\frac{1}{2}$ to $1\frac{4}{5}$ eye-diameters. Dorsal begins slightly behind middle in space between pectoral and ventral origins in half-grown to last two-fifths in adults. Anal origin midway between hind fontanel edge and caudal base in half-grown or about midway between snout tip and last dorsal ray base in adult. Caudal, $1\frac{2}{3}$ in head; pectoral, $1\frac{4}{5}$ to $1\frac{7}{8}$; ventral, 2 to $2\frac{2}{3}$. Outer pectoral spine edge serrate, obsolete with age. Color in alcohol dull brownish, paler below. Seven examples, 303 to 406 mm., from the Quanza River at Cunga.

EUTROPIUS ECLIPSIS, new species.

Head, $4\frac{3}{5}$; depth, 5; D. I, 6; A. II, 52; P. I, 10; V. I, 5; head width, $1\frac{1}{2}$ its length; dorsal spine, $1\frac{2}{3}$; pectoral, $1\frac{1}{6}$; ventral, $2\frac{1}{10}$; snout, 3 in head, measured from upper jaw tip; eye, $4\frac{2}{3}$; mouth width, 2; interorbital, 2.

Body elongate, rather slender, well compressed, deepest at spinous dorsal origin; predorsal trenchant and breast broad. Caudal peduncle strongly compressed, about long as deep, and least depth about $3\frac{1}{2}$ in total head length.

Head broader below, converges above, and profiles alike. Snout broad; front edge but little convex as seen from above, and length in profile about two-fifths its width. Eye lateral, though equally visible above and below; upper edge level with closed tip of lower jaw, and hind edge slightly advanced before middle in head length. Mouth wide, lower jaw slightly protruding, and rami low. Teeth villiform, in broad bands in jaws and across vomer and palatines; latter continuous band slightly widens backward on each palatine. Tongue broad, thick, free around front edge. Barbels fine; long nasal reaching back behind eye or about $1\frac{2}{3}$ in head; maxillary about half an eye-diameter beyond head; outer mental about an eye-diameter beyond eye, and inner mental about two-fifths length of

outer. Front nostril close to upper jaw edge, simple pore, about first fifth in snout length. Hind nostril close behind nasal barbel, or about midway in snout profile. Interorbital broadly convex. Occipital process long narrow ridge about two-thirds to dorsal origin, and meets dorsal buckler.

Gill-opening well forward or about to last fourth of snout in profile. Rakers 5 + 11, lanceolate, about three-fourths of filaments and latter one and one-half in eye.

Bones of head all covered with thin skin and with rather weak striae. Humeral process about $2\frac{2}{3}$ pectoral spine, with a few striae. Lateral line complete, midway along side, deflected from caudal base downward.

Dorsal inserted about first third between mandible tip and caudal base, compressed slender spine with front edge smooth, and about 20 antrorse serrae on hind edge; first ray, $1\frac{1}{4}$ in head. Adipose fin

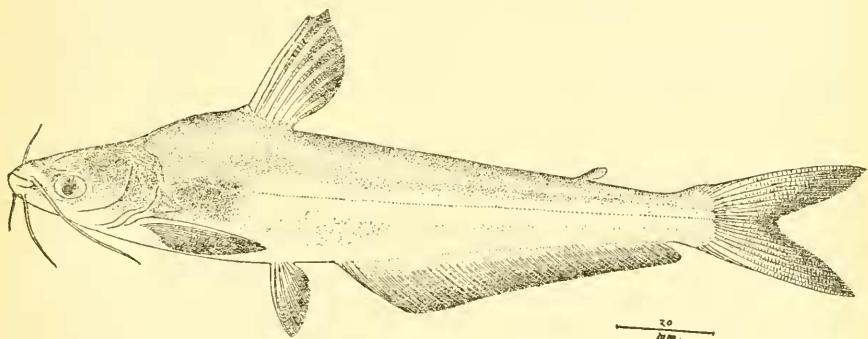


FIG. 12.—EUTROPIUS ECLIPSIS.

inserted about last two-fifths in space between depressed dorsal tip and caudal base, about long as eye. Caudal deeply forked (damaged), apparently with slender sharply pointed subequal lobes, both little longer than head. Anal inserted about midway between mandible tip and last anal ray base; front rays slightly longer or fourth branched about 2 in head. Pectoral not quite to ventral; spine like that of dorsal and hind edge with 18 antrorse serrae. Ventral insertion falls about opposite fourth dorsal ray base; fin small and reaches but little beyond front of anal. Vent close before anal.

Color in alcohol brown above, paler below on head, belly, and trunk, and silvery-white tinge along body below lateral line and above long anal. Fins and barbels all pale. Iris pale straw color. Above pectoral large dusky blotch, entirely before dorsal, and its extent about $1\frac{1}{2}$ eye-diameters. Anal with an inconspicuous median longitudinal streak, its entire length, formed of minute dusky dots.

Length, 185 mm. (Caudal tips damaged.)

Type.—Cat. No. 42342, U. S. N. M. Quanza River at Cunga, Angola. William Harvey Brown. U. S. Eclipse Expedition, 1889.

Also Cat. No. 42341, same data, four paratypes. These show: Head, $4\frac{1}{2}$ to $4\frac{3}{4}$; depth $4\frac{3}{8}$ to $5\frac{1}{8}$; D. I, 6; A. II, 50 to 54; snout $2\frac{3}{8}$ to $3\frac{1}{8}$ in head measured from upper jaw tip; eye, $3\frac{1}{2}$ to $4\frac{3}{4}$; mouth width, 2 to $2\frac{1}{8}$; interorbital, $2\frac{1}{5}$ to $2\frac{1}{3}$; head width, $1\frac{2}{5}$ to $1\frac{1}{3}$; length, 130 to 150 mm.

This species is allied with *Eutropius ansorgii* Boulenger, which I have not seen. It appears to differ in the longer barbels, more slender body, fewer anal rays, and lower position of the eye.

(For the United States Eclipse expedition.)

CHRYSICHTHYS FURCATUS Günther.

Head, $3\frac{1}{5}$ to $3\frac{1}{4}$; depth, $4\frac{1}{5}$ to $4\frac{1}{4}$; D. I, 6; A. V, 10 or 11; snout, $2\frac{1}{4}$ to $2\frac{1}{2}$ in head; eye, $5\frac{1}{2}$ to $6\frac{1}{5}$; maxillary, 4; interorbital, 3; rakers, 8 + 14 or 15. Inner edges of lips strongly papillose. Maxillary barbel but little beyond eye, $1\frac{2}{5}$ in head. Adipose fin long as snout. Color in alcohol brownish above; sides and below with silvery-white reflections. Length, 382 to 418 mm.; two examples. Quanza River at Cunga.

CHRYSICHTHYS BOCAGII Boulenger.

Head, $3\frac{1}{4}$ to $3\frac{1}{3}$; depth, $4\frac{2}{5}$ to 5; D. I, 6; A. V or VI, 9 I or 10 I; snout, $2\frac{1}{3}$ to $2\frac{1}{2}$ in head; eye, 4 to 5; maxillary, $3\frac{7}{8}$ to $4\frac{1}{4}$; interorbital, $3\frac{1}{4}$ to $3\frac{3}{4}$; body slender, compressed. Head slightly wider than deep. Snout broad as long. Eye elevated, midway in head length. Mouth large, transverse; lower jaw much shorter. Lips thick, fleshy, papillose inside. Lower lip and chin papillose. Teeth villiform, in broad bands in jaws. Elongate band of villiform vomero-ptyergoid teeth. Maxillary barbel, $1\frac{1}{4}$ in head. Outer mental barbel very slightly over half of head. Interorbital slightly concave, flattened medially. Rakers, 8 to 10 + 14 to 17. Fins large; depressed dorsal, $1\frac{1}{5}$ to adipose fin, last large. Caudal lobes, variably shorter or longer, usually lower trifle longer and larger. About 19 inner serrae on pectoral spine. Color in alcohol dull brownish above, sides and below silvery-white. Fins, dull uniform brownish. Length, 186 to 285 mm. Three from the Quanza River at Cunga.

GNATHONEMUS ANGOLENSIS Boulenger.

Head, $3\frac{7}{8}$ to 4; depth, 3 to $3\frac{3}{4}$; D. III, 22, seldom 21; A. III, 28, sometimes 29 or 30; scales, 50 or 51 in lateral line to caudal base and 5 or 6 more on latter; 10 or 11 scales above lateral line to dorsal origin, 10 to 12 below to anal origin; predorsal scales, 47 to 50; snout, 4 in head, measured from upper jaw tip; eye, 5 to $5\frac{2}{3}$; interorbital, 3 to $3\frac{1}{2}$. Body well compressed. Least depth of caudal peduncle, $1\frac{2}{3}$ to $1\frac{1}{2}$ its length, or $2\frac{2}{3}$ to 3 in head. Head width, $1\frac{1}{3}$ to 2 in its length. Snout

convex, length $\frac{7}{8}$ to 1 its width. Eye well advanced, hind profile about first two-fifths in head length. Mouth cleft very short, wide. Jaws with 5 conic teeth above in front and 6 below in front. Interorbital convex. Scales with 9 or 10 basal radii. Each caudal lobe scaly over basal two-thirds and 12 scales around caudal peduncle. Dorsal inserted little behind anal origin, slightly nearer caudal base than pectoral origin; first branched ray, $1\frac{7}{8}$ to 2 in head; that of anal, $1\frac{5}{8}$ to 2. Caudal well forked, about $1\frac{1}{8}$ in head; pectoral, $1\frac{1}{3}$ to $1\frac{2}{3}$, and ventral, $2\frac{1}{3}$. Color in alcohol, brownish above to silvery-white below. Fins all pale. Iris grayish. Four examples, 98 to 116 mm. Quanza River at Cunga.

One of the above examples is distorted, having the lateral line and apparently vertebral column in a somewhat sigmoid pattern.

BARBUS EUTAENIA Boulenger.

Head, $3\frac{3}{4}$ to $3\frac{7}{8}$; depth, $2\frac{7}{8}$ to $3\frac{1}{8}$; D. III, 8, once 7; A. III, 5; scales 23 to 25 in lateral line to caudal base and 2 more on latter, rarely 3; 5 scales above lateral line, 3 below, rarely 4; predorsal 9, rarely 10; snout, 3 to $3\frac{3}{4}$ in head; eye, $3\frac{1}{5}$ to 4; maxillary, $3\frac{2}{5}$ to 4; interorbital, $2\frac{4}{5}$ to 3. Body well compressed, back slightly elevated. Caudal peduncle well compressed, least depth about $1\frac{1}{2}$ to $1\frac{2}{3}$ its length, or $1\frac{1}{3}$ to $1\frac{4}{5}$ in head. Head width, $1\frac{2}{3}$ to $1\frac{3}{4}$ its width. Eye advanced, hind pupil edge at least midway in head length. Mouth small, closed lower jaw slightly included. Maxillary not quite to eye. Front barbel slightly larger than eye and hind one longer, or equals eye and space to hind nostril. Interorbital broadly convex. Rakers, 1+5 short points, about one-sixth of filaments, which $1\frac{1}{4}$ in eye. Pseudobranchiae about one-third of gill-filaments. Teeth 2, 3, 5—5 3, 2, some of larger hooked and with well-developed grinding surfaces. Scales with 3 to 5 basal scallops, 5 or 6 distinct basal radii, and about 4 or 5 apical radii. About 12 scales around caudal peduncle. Caudal base covered with small scales for at least two-fifths of lobe externally. Free axillary ventral scaly flap one-third of fin. Scales on breast moderately small, about 9 across between pectoral origins. Dorsal origin nearly an eye-diameter nearer snout tip than caudal base, or about midway in half grown examples. Dorsal spine with about 28 to 30 serrae along hind edge, variably little shorter or longer than head. Upper dorsal edge a little emarginate. Anal inserted little before depressed dorsal end or midway between ventral origin and caudal base, nearer ventral in half grown. Caudal well forked, usually an eye-diameter longer than head; pectoral, $1\frac{1}{8}$ to $1\frac{1}{4}$; ventral, $1\frac{1}{5}$ to $1\frac{1}{4}$.

Color in alcohol pale brownish generally, with bright or silvery reflections, and lower surface paler. Side of head, iris, and broad

ill-defined band along middle of side silvery white, with slightly leaden undershade at line within silvery area. Fins all pale brownish, ends of dorsal rays blackish. Fourteen examples, 118 to 148 mm. Quanza River.

These all differ from Boulenger's figure ¹ as it does not show the caudal lobes sealed basally above and below, the upper dorsal edge not emarginate, while the dark median lateral band bends a little below, so to appear nearly concurrent with the lateral line, doubtless conditions of age.

BARILIUS ANSORGH Boulenger.

Two examples, 83 to 105 mm., labeled "West Africa," from the Eclipse Expedition, are included here as they may have been obtained in Angola. Head, $3\frac{1}{2}$ to $3\frac{3}{4}$; depth, $3\frac{3}{4}$ to $4\frac{1}{4}$; D. II, 7; A. III, 13 or 14; scales 40 or 41 in lateral line to caudal base and 3 more on latter.

ALESTES ANSORGH Boulenger.

Head, 4 to $4\frac{3}{5}$; depth, $3\frac{1}{2}$ to $3\frac{4}{5}$; D. II, 8; A. III, 17 to 19; scales, 34 to 38 in lateral line to caudal base and 2 or 3 more on latter; 6 scales above lateral line, 3 below to anal; predorsal scales, 15 to 17; snout 3 to $3\frac{1}{2}$ in head: eye, $3\frac{1}{3}$ to 4; maxillary, $2\frac{7}{8}$ to $3\frac{1}{8}$; interorbital, $2\frac{2}{3}$ to 3. Elongate, slightly ovoid or lower profile more convex, deepest at ventral origin. Caudal peduncle compressed, about deep as long; least depth, $2\frac{1}{4}$ to $2\frac{3}{4}$ in head. Head width, $1\frac{4}{5}$ to 2 in its length. Snout conic; length, three-fourths to four-fifths its width. Eye large, with broad adipose lid, advanced or hind pupil edge slightly before center in head length. Mouth broad, gape short or to nostrils, about midway in snout length. Lips thick, tough. Upper teeth in 2 rows, 6 outer smaller with 3 to 5 points; 7 inner broader with 7 or 8 points; and in all median point largest. Lower teeth 8, large except last lateral, with 5 to 7 points, and median point enlarged. Also pair of smaller conic teeth, close inside, outer medially. Maxillary extends slightly behind nostril, not quite to eye. Nostrils together, midway in snout length. Interorbital convex. Broad suborbitals not completely covering cheek, leave narrow naked strip below. Rakers, 11 + 17, lanceolate, rather flexible, 2 in filaments, $1\frac{2}{3}$ in eye. Scales large; basal striae 1 to 5 and apical 2 to 6; fewer in half-grown. Dorsal origin midway between snout tip and caudal base; slightly more advanced in half-grown; first branched ray, $1\frac{1}{8}$ to $1\frac{1}{6}$ in head. Adipose fin, $1\frac{1}{8}$ to $1\frac{1}{3}$ in eye. Anal inserted about opposite depressed dorsal tip, slightly advanced in half-grown; first branched ray, $1\frac{1}{2}$ to 2 in head. Caudal well forked, lower lobe slightly longer, $1 + \frac{1}{5}$ to $1 + \frac{1}{4}$ in head; pectoral, $1\frac{1}{8}$ to $1\frac{1}{6}$, ventral, $1\frac{1}{3}$ to $1\frac{2}{3}$. Color in alcohol uniform brownish above, sides and fins all paler. Body with silvery reflections, but no dark blotches on

paired fins. Four examples from the Quanza River at Cunga, 133 to 349 mm.

GYMNOTHORAX MORINGUA (Cuvier).

Head, $3\frac{1}{8}$ to vent; head and trunk combined, $1\frac{1}{4}$ in tail; eye, $1\frac{1}{4}$ in snout; mouth, $2\frac{1}{5}$ in head. Snout conic; width, $1\frac{1}{4}$ in its length. Eye over middle in gape. Jaws closing, lower slightly included. Teeth uniserial, large, 3 large depressible canines in median row above in front. Short row of small vomerine teeth. Nasal tube long as vertical pupil diameter. Interorbital about three-fourths of eye. Dorsal begins at last two-fifths between rictus and gill-opening. Color in alcohol rather coarsely mottled with deep brown on whitish general color. Length, 202 mm. One from "West Africa," obtained by the *Eclipse* expedition.

Agrees with an example, 173 mm. long, from St. Martins Island, Dutch West Indies, in almost every respect.

ECHIDNA CATENATA (Bloch).

Head, $3\frac{7}{8}$ to $4\frac{1}{2}$ to vent; tail, $1\frac{1}{4}$ to $1\frac{1}{3}$ in combined head and trunk; eye, $1\frac{1}{2}$ to $1\frac{3}{5}$ in snout; mouth, $2\frac{4}{5}$ to $3\frac{1}{5}$ in head; head width, $3\frac{2}{5}$ to $3\frac{3}{4}$. Snout conic, about long as wide. Eye center about opposite last third in gape; more advanced in young. Jaws closing, form rather blunt even muzzle. Teeth in jaws uniserial in front, where first 6 and front median enlarged; hind ones smaller and biserial. Row of 3 large median vomerine teeth. Lower teeth biserial in front, uniserial behind, and inner front row enlarged. Nasal tube long as vertical pupil diameter. Eye less than interorbital, which wider with age. Dorsal begins close before gill-opening. Color in alcohol deep brown, reticulated with narrow yellowish lines, on trunk laterally largely at vertical cross lines, usually broken into blotches below. In young examples white below, dominant and dark blotches diminish, the white areas often finely dotted or spotted with brownish. Three examples, 158 to 273 mm. from "West Africa."

Compared with three others from St. Martins, Dutch West Indies, no specific differences were found.

FODIATOR ACUTUS (Valenciennes).

Head, $3\frac{2}{3}$; depth, $4\frac{3}{5}$; D. 1, 9, 1; A. 1, 10; scales (pockets), about 50 in lateral line to caudal base, or about 43 from shoulder to caudal base medially; about 23 scales (pockets) before dorsal; 6 scales (pockets) above lateral line to dorsal origin; snout, $2\frac{1}{3}$ in head from upper jaw tip; eye, $3\frac{1}{2}$; maxillary, $4\frac{1}{4}$; interorbital, $3\frac{1}{2}$.

Body elongate, compressed, flattened sides converge below, deepest about midway in length. Head similar, well pointed. Snout long, conic; width $1\frac{1}{2}$ its length. Eye ellipsoid, midway in head, $1\frac{1}{2}$ in snout. Mouth small, lower jaw produced in short beak for space

about three-fifths of horizontal pupil diameter beyond snout. Maxillary not entirely concealed behind by preorbital, about three-quarters to nostril. Teeth minute, in villiform bands in jaws; upper band much broader. Nostrils an elongate slit long as horizontal pupil-diameter. Interorbital level. Rakers, $8+25$, lanceolate, about three-quarters of filaments, latter about two-thirds of eye. Scales caducous, narrowly exposed, each with about 3 marginal striae to 2 basal lobes. Dorsal origin midway between ventral origin and last dorsal ray base; depressed fin slightly beyond caudal base. Anal inserted about opposite first branched dorsal ray base. Caudal well forked, lower lobe (damaged) apparently long as head (?). Pectoral reaches fourth branched dorsal ray, $1\frac{7}{8}$ in body without caudal. Ventral, $1\frac{3}{8}$ in head, reaches vent close before anal.

Color in alcohol with back above pectoral and head above eye brownish; sides and below silvery-white. Iris whitish. Dorsal and pectoral blackish, deepest over outer portions, and rays of former pale or whitish basally. Caudal pale brown. Ventral and anal whitish. Length 143 mm. Loando.

An example, already listed from the Gabun, a little smaller and in poor preservation, shows: head, $3\frac{1}{8}$; depth, 4; D. I, 9; A. I, 10; scales (pockets), 43 from shoulder to caudal base medially; snout, $2\frac{7}{8}$ in head; eye, 3; maxillary, $4\frac{1}{8}$; interorbital, $3\frac{1}{8}$. Lower jaw extends beyond snout tip about three-fifths of eye-diameter horizontally. Rakers, $6+23$ (?). Eye about seven-eighths of snout. Closed maxillary not entirely concealed. Ventral origin about midway between front eye edge and caudal base. Pectoral reaches first two-fifths in dorsal base, $1\frac{7}{8}$ in body without caudal. Anal inserted little before pectoral tip.

No differences could be noted in comparison of the above with an example in the Academy, from Panama.

HEMIRAMPUS BRASILIENSIS (Linnaeus).

Head, from snout tip, $4\frac{1}{4}$ to $4\frac{3}{8}$; depth, $5\frac{2}{3}$ to $6\frac{1}{8}$; D. II, 11, rarely II, 12; A. II, 9 to 11, rarely 8; scales, 55 to 60 in lateral line to caudal base, though last 2 to 7 without tubes, and 6 to 8 more scales over caudal base; 38 to 44 predorsal scales to head; snout, $2\frac{7}{8}$ to 3 in head from upper jaw tip; eye, 4 to $4\frac{2}{5}$; maxillary, $3\frac{1}{2}$ to 4; interorbital, $3\frac{3}{8}$ to 4.

Body well compressed; sides flattened. Caudal peduncle with least depth about three-fourths its length. Head pointed, compressed, flattened sides but slightly converging below. Snout conic; width, $1\frac{1}{3}$ its length. Eye large, little advanced, though hind pupil edge slightly behind middle in head length. Maxillary, $\frac{2}{3}$ to eye. Teeth fine or in minute bands in jaws; none in mouth roof. Mandible about long as rest of head. Nostril large, close before upper front

eye edge. Interorbital depressed, scarcely or very slightly convex. Rakers about $10+25$, lanceolate, nearly three-fourths of filaments, and latter about two-thirds of eye. Isthmus narrow frenum. Scales largely caducous, all narrowly imbricated, very deep along side; circuli very fine and mostly continuous above and below. Top of head with two longitudinal arborescent areas in each mastoid region. Lateral line not complete beyond middle of caudal peduncle; large tubes arborescent below. Dorsal inserted about last fourth in space between hind eye edge and caudal base; in smaller examples at last fourth between front eye edge and caudal base; last branched ray about $1\frac{3}{4}$ of first. Anal inserted near first third of dorsal base; fin small. Caudal well forked; upper lobe about three-fourths of lower. Pectoral large, $2\frac{1}{4}$ to ventral; about $2\frac{3}{5}$ in younger. Ventral inserted much nearer caudal than pectoral base.

Color in alcohol dull olive-brown on back, sides, and below paler or silvery white. Underlaid leaden band along dark color of back, not quite wide as pupil, from shoulder to caudal base. Dorsal, caudal, and pectoral pale brownish; other fins whitish. Iris pale. Length, 305 to 382 mm. (Caudal tips and beaks of several damaged.) Loando. Six examples.

These fall into two groups, one with longer pectorals and slightly fewer anal rays, or 8 to 10 branched contrasted with 11 branched in the short-pectoral pair of examples. The long pectoral having been offered as an alleged character for several closely allied species, an examination of the following material in the Academy results.

A Porto Rico specimen, 254 mm. long, shows the pectoral about $1\frac{1}{6}$ in head from upper jaw tip, 10 branched anal rays, and rakers $9+25$. Three Hawaiian examples, largest 355 mm., all have a long pectoral, which about long as head without beak, 10 or 11 branched anal rays, and rakers $11+25$. They represent *H. depauperatus*, Lay and Bennett,¹ and do not appear to differ in any but trivial characters from the African examples. Of three small New Jersey examples, largest 190 mm., the pectoral is $1\frac{1}{3}$ to $1\frac{2}{5}$ in head; branched anal rays 11, and rakers $12+25$. Another example I obtained in Chesapeake Bay, 328 mm. long, has pectoral $1\frac{1}{2}$, branched anal rays 11, and rakers $8+22$. An examination of scales from examples representing all of the above, besides others from other parts of the West Indies, reveals no grounds for specific distinctions. The circuli are all very fine and complete.

The only distinction for *Hemirhamphus balao*, Le Sueur,² which is described with "the tail yellow and bluish," appears to be the "caudal fin black." *Hemirhamphus macrochirus*, Poey,³ is based

¹ Zool. Beechey's Voy., 1839, p. 66. Oahu.

² Journ. Acad. Nat. Sci. Phila., vol. 2, 1823, p. 136. Caribbean Sea near Guadeloupe, Martinique, and Domingo.

³ Memor. H. N. Cuba, vol. 2, 1861, p. 29

on examples 280 to 290 mm. long, with the eye 4 in head, pectoral $1\frac{1}{2}$ in body depth, and upper caudal lobe violet. *Hemiramphus guineensis*, Bleeker,¹ certainly to be referred to my African material, is another synonym as long pointed out by Günther. Bleeker's figure is faulty in that it shows the lateral line continuous to the caudal base.

MUGIL CUREMA Valenciennes.

Head, $3\frac{3}{4}$; depth $3\frac{2}{5}$ to $3\frac{1}{2}$; D. IV-I, 8; A. III, 9; scales, 38 from shoulder to caudal base; 12 scales transversely between soft dorsal and anal origins; 28 to 30 predorsal scales; snout, $3\frac{2}{3}$ to 4 in head; eye, $3\frac{2}{3}$ to 4; maxillary, $3\frac{1}{2}$ to 4; interorbital, $2\frac{1}{4}$ to $2\frac{2}{5}$. Body well compressed, deepest at spinous dorsal origin. Least depth of caudal peduncle $1\frac{1}{10}$ to $1\frac{1}{4}$ its length, or $2\frac{1}{4}$ to $2\frac{2}{5}$ in head. Head width, $1\frac{3}{5}$ its length. Snout length half its width. Adipose eyelid broad, and hind eye edge about midway in head length. Each lip with row of fine or small cilliform teeth, and above inner imperfect row. Maxillary to hind nostril, well exposed. Interorbital broadly convex. Preorbital edge minutely serrate. Rakers 35+60, fine, lanceolate, 2 in filaments which about $\frac{7}{8}$ of eye. Scales with about 10 basal radii. Soft dorsal and anal densely scaly to edges, and caudal scaly except hind edge. Spinous dorsal inserted about midway between snout tip and caudal base, first spine $1\frac{3}{4}$ to $1\frac{7}{8}$ in head. Soft dorsal inserted well behind anal origin, or about midway between spinous dorsal origin and caudal base. Anal inserted behind depressed spinous dorsal tip, first branched rays longest. Caudal deeply forked, about $1\frac{1}{5}$ to $1\frac{1}{2}$ in head, pectoral $1\frac{1}{4}$ to $1\frac{1}{3}$, ventral $1\frac{3}{5}$ to $1\frac{2}{3}$. Color in alcohol olive-brown, paler below. Fins all pale brownish, pectoral base slightly leaden and hind caudal edge dusky. Length of two examples from Loando, 172 to 182 mm.

These specimens agree entirely with American. An example, 165 mm., from Santo Domingo, West Indies, has rakers 36+54. The species is interesting as an addition to the fauna of West Africa.

LIZA SALIENS (Risso.)

Head, $3\frac{1}{2}$ to $3\frac{7}{8}$; depth, $3\frac{1}{2}$ to $3\frac{7}{8}$; D. IV-I, 8; A. III, 9; scales, 34 to 38, from shoulder to median caudal base and 6 more on latter; 13 or 14 scales between soft dorsal and anal origins; 25 to 28 predorsal scales; snout, $3\frac{2}{5}$ to $3\frac{3}{4}$ in head; eye, $4\frac{1}{2}$ to $4\frac{2}{3}$; maxillary, $3\frac{2}{5}$ to $4\frac{1}{5}$; interorbital, $2\frac{2}{5}$ to $2\frac{3}{4}$. Body moderately long, well compressed, deepest about spinous dorsal origin. Caudal peduncle well compressed, least depth, $1\frac{1}{5}$ to $1\frac{1}{3}$ its length, or $2\frac{1}{5}$ to $2\frac{1}{3}$ in head. Head width, $1\frac{3}{4}$ to 2 in its length. Snout wide, length about three-fifths its width. Eye advanced, hind edge about midway in head.

¹ Nat. Verhandel. Holl. Maats. Wet. Haarlem, vol. 18, 1863, No. 2, p. 119, pl. 25, fig. 2. Annonkor Boutry, Guinea.

Mouth wide, would form obtuse angle. Row of minute ciliate teeth in upper jaw. Maxillary exposed, not quite reaching eye. Nostrils close together, front one about midway in snout length. Interorbital broadly convex. Preorbital denticulate at end, few largely concealed denticles along lower edge. Rakers about 30+50, finely lanceolate, about two-thirds of filaments. Scales with 8 to 10 basal radii. Cheek with three rows of scales. No axillary pectoral flap. Anal largely scaly over basal portion; soft dorsal naked, and 3 or 4 scales behind depressed spinous dorsal tip and soft dorsal origin. Spinous dorsal inserted about midway between center in snout length and caudal base, or nearly midway between front pupil edge and caudal base in smaller example, second or longest spine 2 to $2\frac{1}{4}$ in head. Soft dorsal inserted little nearer spinous dorsal origin than caudal base, first ray $1\frac{3}{4}$ to 2 in head, first anal ray $1\frac{3}{8}$ to 2. Caudal well forked, long as head or half an eye-diameter longer, pectoral $1\frac{1}{8}$ to $1\frac{1}{2}$, ventral $1\frac{3}{8}$ to $1\frac{3}{4}$. Color in alcohol pale olive-brown above, sides and below brownish with silvery-white tints. Fins pale brown, hind caudal edge little dusky. Iris pale. Four examples. 178 to 203 mm., from Loando.

My only conformable example from Italy, about 205 mm., shows 9 scales behind its short depressed spinous dorsal, while in a young Italian example there are 6, though none of the Loando examples have over 5.

SPHYRAENA SPHYRAENA (Linnaeus).

Head, $3\frac{1}{2}$; depth, $7\frac{3}{4}$; D. V-I, 1, 8; A. II, 1, 8; scales, 144 in lateral line to caudal base and 7 more on latter; snout $2\frac{1}{2}$ in head from upper jaw tip; eye, 6; maxillary, $2\frac{3}{4}$; interorbital, $4\frac{3}{4}$. Muzzle conic; lower jaw projecting beyond upper about half an eye-diameter; mandible, $1\frac{7}{8}$ in total head length. Head width, $3\frac{2}{5}$ its length. Maxillary reaches nostrils. Scales behind eye to preopercle edge, 17. First dorsal inserted about opposite ventral origin and pectoral three-fourths of space to latter; 3 in head. Least depth of caudal peduncle, $5\frac{1}{2}$ in head; lower caudal lobe, $1\frac{3}{4}$. Length, 407 mm. Loando.

Compared with three smaller Italian examples the scales of the African example have coarser radiating striae, doubtless due to age.

HOLOCENTRUS HASTATUS Cuvier.

Head, $3\frac{1}{2}$ to $3\frac{3}{4}$; depth, 3 to $3\frac{1}{2}$; D. XI, 15, rarely 14; A. IV, 10; scales in lateral line 48 to 51 to caudal base and 6 to 8 more on latter; 5 scales above lateral line and 8 below; snout, $3\frac{7}{8}$ to $4\frac{1}{2}$ in head; eye, 3 to $3\frac{1}{6}$; maxillary, $2\frac{1}{6}$ to $2\frac{1}{2}$; interorbital, $2\frac{3}{4}$ to $3\frac{1}{2}$.

Body elongately ellipsoid, deepest at depressed pectoral tip. Caudal peduncle compressed; least depth half its length, or $3\frac{2}{5}$ to 4 in head. Head width about $1\frac{7}{8}$ its length. Snout convex, length about three-fourths to four-fifths its width. Eye advanced, pupil

slightly before center in head length. Mouth small; lower jaw included slightly in upper. Maxillary to eye center, expansion $1\frac{1}{4}$ to 2 in eye. Teeth fine, conic, in bands in jaws, on vomer and palatines. Nostril about midway in snout. Interorbital level, with superciliary and 2 median longitudinal bony ridges. Opercular spines 2, short, of equal length, and spine at preopercle angle about twice as long. Serrae strong on preopercle, opercle, suborbital and preorbital ridges and edges. Rakers v, 4 + 14, lanceolate, equal filaments, or 2 in eye. Scales narrowly imbricate; basal lobes 4 or 5; apical serrae, 16 to 18, and striae all parallel vertically. Cheeks with 5 rows of scales. Tubes in lateral line simple. Spinous dorsal inserted over pectoral origin; fourth spine $1\frac{7}{8}$ to 2 in head. Soft dorsal origin much nearer caudal base than pectoral origin, or at last third between hind pupil edge and caudal base; second ray, $1\frac{1}{2}$ to $1\frac{3}{5}$ in head. Anal opposite dorsal, similar; third spine, $1\frac{7}{8}$ to 2 in head; first ray, $1\frac{3}{4}$ to 2. Caudal strongly forked, $1\frac{1}{3}$ to $1\frac{2}{5}$ in head; pectoral, $1\frac{1}{2}$ to $1\frac{3}{5}$; ventral, $1\frac{1}{4}$ to $1\frac{1}{5}$.

Color in alcohol faded dull brownish, apparently each row of scales with pale streak. Back gray-brown, line of demarcation along close below lateral line. Lower surface with dull brassy tint. Iris and side of head dull brassy-brown. Fins pale brown; some smaller examples with dusky tint on outer portion of membranes between first and second dorsal spines, and another between tenth and eleventh. Length of 6 examples, 84 to 96 mm. Loando.

Cuvier's figure does not show the black spot between first two dorsal rays as mentioned in his text relative to his first example, which without locality. The figure also shows the third anal spine twice length of fourth and opercular flap behind the long opercular spine black.

TRICHIURUS LEPTURUS Linnaeus.

Six examples from Loando.

CARANX ANGOLENSIS, new species.

Head, $3\frac{1}{5}$; depth, 4; D. VIII—I, 31; A. II—I, 27; P. II, 20; V, I, 5 scales, 53 in curved lateral line, and 39 in straight portion with 8 of latter on caudal base; head width, $2\frac{1}{2}$ its length; mandible, 2; third dorsal spine, $2\frac{1}{5}$; first dorsal ray, $2\frac{1}{4}$; first anal ray, $2\frac{1}{3}$; upper caudal lobe, $1\frac{2}{5}$; pectoral, $1\frac{1}{5}$; ventral, $2\frac{1}{10}$; snout, $3\frac{1}{4}$ in head, measured from upper jaw tip; eye, $3\frac{3}{8}$; maxillary, $2\frac{2}{5}$; interorbital, $3\frac{1}{4}$.

Body well compressed, elongately fusiform, front profiles evenly convex and lower slightly more so behind to greater depth at spinous anal origin. Caudal peduncle slender, moderately depressed, least depth 2 and least width 3 in its length.

Head well compressed, moderate in depth, pointed, and flattened sides converge more below. Snout conic, width $1\frac{1}{2}$ its length. Eye

moderate, advanced, elevated, and hind pupil edge about midway in head length measured from upper jaw. Mouth oblique, gape nearly straight, and mandible well protruded. Lips fleshy, somewhat narrow. Maxillary to eye and upper edge not entirely slipping below preorbital, terminal expansion 2 in eye. Short oblique groove down from behind hind maxillary end when mouth closes. Teeth small, sharp pointed, uniserial largely, though at least two rows in front of each jaw. Bands of similar teeth on vomer and palatines. Tongue long, rather slender, free and round in front, with two elongate patches of minute simple teeth. Mandibular rami well elevated inside mouth. Nostrils together, similar, or hind one but slightly larger, fall at last third in snout. Interorbital broadly convex, median keel rising close behind hind nostril and extends to spinous dorsal. Opercle with few striae above and forward.

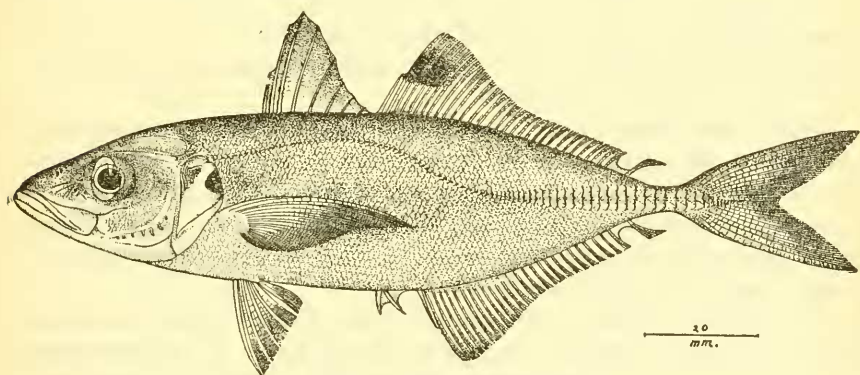


FIG. 13.—*CARANX ANGOLENSIS*.

Gill-opening extends forward about midway in space between hind nostril and front eye edge. Rakers, 16 + 37, slender, lanceolate, slightly longer than filaments, or three-fifths of eye. Pseudo-branchiae nearly two-fifths of eye. Isthmus long narrow triangle, each edge slightly raised.

Scales very caducous, with moderate concentric circuli. Head largely scaly; snout, mandible, and lips naked. Spinous dorsal with low basal scaly sheath, and front of soft dorsal and anal each with scaly basal sheath. Caudal base scaled, also pectoral base. Straight portion of lateral line begins after elevated dorsal rays. Scutes moderate, deepest 5 in greatest body depth.

Spinous dorsal small; slender spines pungent; third longest, with second and fifth subequal, depressible in a groove and reaching soft dorsal origin. Spinous dorsal inserted about over first fifth in pectoral length, or nearly midway between eye center and depressed pectoral tip. Soft dorsal inserted nearly over last fifth in depressed pectoral, or nearly midway between hind nostril and caudal base.

First few front rays moderately elevated, graduated down from first or longest ray. Anal spines short, depressible in groove, posterior little longer, origin of fin opposite that of soft dorsal. Soft anal, like soft dorsal, inserted about opposite pectoral tip, or about midway between hind eye edge and caudal base. Caudal well forked, small slender lobes (damaged) apparently pointed and equal. Pectoral moderately long, falcate, origin about level with lower eye rim. Ventral moderate, little longer than post-ocular region. Vent close before spinous anal origin, well behind ventral tips.

Color in alcohol dull brownish with somewhat leaden tint on back, sides and lower surface whitish, with silvery reflections. Black blotch on upper opercle edge not quite deep as vertical pupil-diameter. Fins all pale brownish, except large black blotch on dorsal near tip and along front edge, its diameter slightly less than eye. Iris yellowish. Peritoneum pale.

Length about 140 mm. (caudal tips damaged).

Type.—Cat. No. 42301 U.S.N.M. Loando, Angola. Wm. Harvey Brown, U. S. Eclipse Exp. 1889.

Besides the above, also Nos. 42302 and 42300, including five paratypes, same data. These show: head, $3\frac{1}{2}$ to $3\frac{1}{6}$; depth, $3\frac{2}{3}$ to $3\frac{7}{8}$; D. VIII—I, 31, sometimes 29 or 32; A. II—I, 27 or 28; scutes, 33 to 39 in straight section of lateral line; snout, 3 to $3\frac{1}{2}$ in head from upper jaw tip; eye, $3\frac{2}{3}$ to $3\frac{4}{5}$; maxillary, $2\frac{2}{3}$ to $2\frac{2}{3}$; interorbital, $3\frac{2}{3}$ to $3\frac{3}{4}$; length, 120 to 137 mm.

This species is allied with *Caranx ruber* (Bloch) from the West Indies and falls within the subgenus *Elaphrotoxon*. It differs strikingly, however, upon comparison, in the last dorsal and anal rays being semidetached or at least much further separated from their penultimate rays, suggestive of *Decapterus*. These last isolated rays are, however, connected by at least basal membranes with their antecedents.

Caranx sanctae-helenae Valenciennes¹ is doubtfully referred by Günther² to *Caranx maruadsi* Schlegel. Valenciennes gives more dorsal (35) and anal rays (30). He says the last dorsal and anal rays each form a "fausse nageorie bien distincte." The scutes are in agreement with my Loando examples. If a *Decapterus*, as allowed by Poey, it is not satisfactorily defined.

(Named for Angola.)

POMADASIS SUILLUM (Valenciennes).

Head, $2\frac{3}{4}$ to $2\frac{4}{5}$; depth, $2\frac{3}{5}$ to $2\frac{7}{8}$; D. X or XI, I 16, rarely 15; A. III, 8, sometimes 9 or 10; scales 50 to 54 in lateral line to caudal base and 9 to 14 more on latter; 5 to 7 scales above lateral line to

¹ Hist. Nat. Poiss., vol. 9, 1833, p. 28. Sainte-Hélène.

² Cat. Fish. Brit. Mus., vol. 2, 1860, p. 428.

soft dorsal origin and 12 to 15 below; snout, 3 to $3\frac{1}{2}$ in head; eye, $3\frac{1}{2}$ to $4\frac{1}{2}$; maxillary, $3\frac{1}{2}$ to $3\frac{2}{3}$; interorbital, $3\frac{7}{8}$ to 5. Back little elevated, body well compressed; least depth of caudal peduncle, $1\frac{1}{2}$ to $1\frac{1}{4}$ its length, or $3\frac{1}{2}$ to $3\frac{3}{4}$ in head. Head width, $2\frac{1}{8}$ to $2\frac{1}{2}$ its length. Snout conic, long as wide, little longer in young. Eye little advanced or hind pupil edge midway in head length. Mouth small, well inclined, lower jaw slightly included. Maxillary to front nostril, to hind nostril in young. Bands of fine teeth in jaws. Interorbital convex. Hind preopercle edge with 16 denticles, lower larger. Rakers, II 6+16, lanceolate, about 2 in filaments and latter $1\frac{1}{2}$ in eye. Scales with 8 to 10 basal striae. Scales smaller along body edges and fin bases. Tubes in lateral line simple. Dorsal spines strong, third, $2\frac{1}{8}$ to $2\frac{1}{2}$ in head; second ray, $2\frac{2}{3}$ to $2\frac{7}{8}$. Second anal spine longest, 2 to $2\frac{1}{4}$ in head, always slightly longer than third, first ray, $2\frac{1}{4}$ to $2\frac{1}{2}$. Caudal emarginate, $1\frac{1}{4}$ to $1\frac{1}{3}$ in head; pectoral, $1\frac{1}{10}$ to $1\frac{1}{8}$; ventral, $1\frac{2}{3}$ to $1\frac{3}{4}$. Color in alcohol brownish on back, sides and below silvery-white. Back above lateral line with many dark obscure spots, rather irregular and broken into blotches though mostly in oblique rows. Pale lengthwise subbasal streaks on dorsals with pale brown above and below. Round deep brown blotch on opercle above, slightly less than eye. Eight examples, 140 to 175 mm. Loando.

In this and the following species the long anal spines are always shorter than the first anal ray, whereas in *P. jubelini* the second at least is longer. The following species differs from *P. suillum* in the second spine constantly subequal with the third, and the increased anal rays.

POMADASIS BENNETTI (Lowe).

Head, $2\frac{2}{3}$ to $2\frac{7}{8}$; depth, $2\frac{2}{3}$ to $2\frac{3}{4}$; D. XI, I, 16; A. III, 12; scales, 52 to 54 in lateral line to caudal base and 6 to 8 more on latter; 7 or 8 scales above lateral line to soft dorsal origin and 13 below; snout $3\frac{1}{8}$ to $3\frac{2}{3}$ in head; eye, 3 to $3\frac{1}{2}$; maxillary, $3\frac{1}{8}$ to $3\frac{7}{8}$; interorbital, $3\frac{7}{8}$ to $4\frac{1}{4}$. Back scarcely elevated and least depth of caudal peduncle slightly greater than eye. Head width about $2\frac{1}{4}$ its length. Snout conic, about long as wide. Eye little advanced or hind pupil edge about midway in head length. Mouth small, lower jaw slightly included. Maxillary to front nostril. Bands of fine teeth in jaws. Interorbital slightly convex. Hind preopercle edge with 23 denticles. Rakers II, 6+12, III, lanceolate, about 2 in filaments or 4 in eye. Scales with 7 or 8 basal striae. Scales smaller along fin bases and body edges. Tubes in lateral line simple. Third dorsal spine, $2\frac{1}{4}$ in head; first dorsal ray, $2\frac{3}{4}$; second anal spine, $2\frac{2}{3}$; first anal ray, 2. Caudal emarginate, $1\frac{1}{4}$ in head; pectoral; $1\frac{1}{8}$; ventral, $1\frac{3}{8}$. Color in alcohol brownish on back, sides, and below silvery-white; above lateral line traces of deeper brown obsolete dots or small spots. Fins all brown-

ish, spinous dorsal tinged with dusky. Two examples, 83 to 137 mm., one from Loando and the other from Elmina, Ashantee.

DENTEX MACROPHthalmus (Bloch).

Head, $2\frac{3}{5}$ to $2\frac{3}{4}$; depth, $2\frac{1}{4}$ to $\frac{2}{3}$; D. XII, 10, 1; A. III, 8, 1; scales, 52 or 53 in lateral line to caudal base and 6 or 7 more on latter; 6 scales above lateral line, 13 below; snout, $3\frac{1}{3}$ to $3\frac{7}{8}$ in head; eye, $3\frac{1}{5}$ to $3\frac{1}{2}$; maxillary, $2\frac{1}{2}$ to $2\frac{3}{5}$; interorbital, $3\frac{3}{4}$ to 4; rakers, 9 to 11 + 17 or 18. Cheek with 7 rows of scales. Length of 3 examples, 298 to 325 mm. Loando.

These agree well with a small Italian example.

PAGELLUS ERYTHRINUS (Linnaeus).

Head, $2\frac{9}{10}$; depth, $2\frac{2}{3}$; D. XII, 10, 1; A. III, 10, 1; scales, 55 in lateral line to caudal base and 5 more on latter; 4 scales above lateral line to second dorsal origin, 13 below; snout, 3 in head; eye, $3\frac{2}{3}$; maxillary, 3; rakers IV, I + 10, lanceolate, half of filaments and latter $1\frac{1}{2}$ in eye; length, 200 mm. Loando.

Agrees with a series of Mediterranean examples of all ages, which show rakers 4 or 5 + 8 to 10. The scales of all show 8 or 9 basal striae.

PAGELLUS MORMYRUS (Linnaeus).

One from Loando.

DIPLODUS SARGUS (Linnaeus).

One example. Loando.

TILAPIA ANDERSONII (Castelnau).

Head, $2\frac{5}{8}$ to $2\frac{7}{8}$; depth, $2\frac{2}{3}$; D. XV or XVI, 11 or 12; A. III, 8 to 11; scales, 19 to 21 in upper section of lateral line, 10 to 13 in horizontal section to caudal base and 2 or 3 more on latter; 3 scales above upper lateral line to soft dorsal origin, 8 below from horizontal lateral line to spinous anal origin; 9 or 10 predorsal scales; snout $2\frac{3}{5}$ to 3 in head; eye, $3\frac{2}{5}$ to $4\frac{2}{5}$; maxillary, $3\frac{2}{5}$ to $3\frac{1}{2}$; interorbital, $2\frac{3}{5}$ to 3. Body elongately ellipsoid. Least depth of caudal peduncle, $2\frac{1}{5}$ to $2\frac{1}{3}$ in head. Head width, $1\frac{1}{5}$ to $1\frac{1}{2}$ its length. Snout length, four-fifths its width, long as wide in young. Eye advanced, or hind pupil edge slightly before middle in head length; eye center about midway in head in young. Mouth small, jaws about even. Maxillary extends very little beyond nostril, slightly more so in young. Teeth in young, 36 in outer upper row and 30 in outer lower row, all well notched, and 2 to 4 inner inconspicuous rows of tridentate teeth. Adult teeth, 70 in each outer row and 6 to 8 inner irregular rows. Interorbital, convex. Rakers, 4 + 22, or about 3 + 10 in young, short, lanceolate; 4 in filaments, and latter equal eye. Scales, cycloid; basal striae about 13 in young, 16 to 18 in adult; circuli mostly

complete. Cheek with 2 or 3 rows of scales. Scales on breast small, 25 to 27 before ventral origin to isthmus. Lateral line with simple tubes. Spinous dorsal edge notched; sixth spine, $2\frac{2}{3}$ to $2\frac{3}{4}$ in head. Soft dorsal and anal end in long points behind or about two-fifths in caudal; fifth dorsal ray, $1\frac{1}{8}$ to $1\frac{1}{2}$ in head; third anal spine, $2\frac{1}{8}$ to $2\frac{1}{3}$; fourth anal ray, $1\frac{1}{8}$ to $1\frac{3}{8}$. Caudal slightly emarginate behind. Pectoral with upper median rays longest to middle of soft anal base, 1 to $1\frac{1}{2}$ in head; ventral, $1\frac{1}{10}$ to $1\frac{1}{8}$. Ventral spine, half or less than fin length; long pointed first ray nearly to soft anal origin. Color in alcohol brownish, each scale with median small round pale spot. Pectoral uniform; other fins all more or less with small round pale spots, mostly terminal on ventral. Opercle with slaty-black blotch little less than eye. Eleven examples, 109 to 203 mm. Quanza River at Cunga.

TILAPIA HEUDELOTI A. Dumeril.

Head $2\frac{3}{8}$ to $3\frac{1}{10}$; depth, 2 to $2\frac{1}{5}$; D. XV or XVI, 10 to 14; A. III, 8 to 11; scales, 18 to 21 in upper section of lateral line, 9 to 15 in horizontal section to caudal base, and 2 or 3 more on latter; 2 or 3 scales above upper lateral line to soft dorsal origin and 6 to 8 below lower lateral line to spinous anal origin; 8 to 11 predorsal scales; snout, $2\frac{1}{4}$ to $3\frac{1}{2}$ in head; eye, $3\frac{1}{3}$ to 4; maxillary, $3\frac{1}{3}$ to 4; interorbital, $2\frac{1}{2}$ to $3\frac{1}{4}$. Body elongately ellipsoid. Least depth of caudal peduncle, $1\frac{2}{3}$ to $2\frac{1}{4}$ its width. Head width, $1\frac{2}{3}$ to $2\frac{1}{3}$ its length. Snout long as wide; length about four-fifths its width in young. Eye advanced; hind pupil edge about midway in head length in young; with age, front pupil edge about midway. Mouth small, lower jaw slightly included, sometimes slightly protrudes in young. Maxillary little beyond nostril in young, halfway beyond to eye with age. Outer teeth about 32 and lower 30 in young, all well notched, and 2 or 3 inner inconspicuous rows of tridentate teeth, well separated from outer rows. Adult teeth, 50 above and 25 below in outer row, all well notched, and 4 inner irregular rows of less conspicuous tridentate teeth in each jaw, well separated from outer row. Interorbital convex. Rakers, 4+10, short, lanceolate, half of filaments, or $1\frac{3}{4}$ in eye. Scales cycloid; basal striae, 11 to 14; circuli mostly complete. Cheek with 2 or 3 rows of scales. Scales on breast small, 24 to 26 before ventral origin to isthmus. Tubes in lateral line simple, or occasional small irregular accessory branch. Spinous dorsal edge notched; last spine, $1\frac{1}{2}$ to $2\frac{2}{3}$ in head. Soft dorsal and anal end in long points behind or about two-thirds in caudal, fifth dorsal ray, $1+1\frac{1}{4}$ to 2 in head; third anal spine, $2\frac{1}{8}$ to $2\frac{1}{2}$; fifth anal ray, $1+\frac{2}{7}$ to 2. Caudal slightly emarginate behind, $1+\frac{1}{8}$ to $1\frac{1}{8}$ in head. Pectoral with upper median rays longest, not quite to vent or within an eye-diameter of anal to anal in young; $1+\frac{1}{4}$ to $1\frac{1}{3}$ in

head; ventral, $1 + \frac{1}{4}$ to $1\frac{1}{4}$. Ventral spine, two-fifths of fin, which reaches far back as pectoral tips extend. Color in alcohol olive-brownish, generally largely uniform in adult; young with about 8 dark vertical bands. Blackish opercular blotch little less than eye-diameter. Black blotch about size of pupil at soft dorsal origin, larger and ocellate in young, and with 4 or 5 dark oblique streaks behind, much broader and fewer in young. Several dark bars on last anal rays in adult. Length, 49 to 225 mm.

The above account from 8 examples from the Quanza River, besides an adult from the St. Pauls River, in Liberia, and 26 examples from the Beyah River, at Elmina, in Ashantee, all previously listed.

TILAPIA CABRAE Boulenger.

Head, $2\frac{7}{8}$; depth, 2 to $2\frac{1}{8}$; D. XV, 12 or 13; A. III, 9 or 10; scales, 21 or 22 in upper section of lateral line, 10 to 13 in horizontal section to caudal base, and 2 to 4 more on latter; 2 or 3 scales above upper lateral line to soft dorsal origin, and 7 or 8 below from horizontal lateral line to spinous anal origin; 10 to 12 predorsal scales; snout, $2\frac{3}{4}$ to $3\frac{1}{8}$ in head; eye, $3\frac{2}{3}$ to 4; maxillary, $3\frac{1}{2}$ to $3\frac{1}{2}$; interorbital, $2\frac{2}{3}$ to $2\frac{2}{3}$. Body rather deeply ellipsoid, with predorsal usually somewhat prominent. Head width about half its length. Snout length about four-fifths to five-sixths its width. Eye advanced, or hind pupil edge slightly before middle in head length in young, scarcely median in larger examples. Mouth small; jaws about even. Maxillary extends slightly beyond nostril in young, or two-fifths in space beyond to eye in larger examples. Teeth in small examples, 36 in upper outer row and 40 in lower outer row, all well notched, and 3 or 4 inner rows of smaller tridentate teeth in each jaw. Adult teeth similar; outer in both jaws 50 and inner rows 7 or 8. Interorbital convex. Rakers, 4+13 or 14, short, lanceolate, 3 in filaments or $1\frac{1}{2}$ in eye. Scales cycloid, basal striae 14 to 16, circuli mostly complete. Cheek with 3 or 4 rows of scales. Scales on breast small, 21 or 22 before ventral origin to isthmus. Lateral line with simple tubes. Spinous dorsal edge notched, last spine $1\frac{1}{2}$ to $1\frac{1}{2}$ in head. Soft dorsal and anal end in long points two-fifths to one-half in caudal; fifth dorsal ray, $1\frac{1}{8}$ to $1\frac{1}{4}$ in head, third anal spine 2 to $2\frac{1}{8}$, fourth anal ray $1\frac{1}{8}$ to $1\frac{1}{4}$. Caudal convex behind, $1\frac{1}{8}$ in head. Pectoral variably to vent, occasionally to anal; $1\frac{1}{10}$ to $1\frac{1}{8}$ in head; ventral, 1 to $1\frac{1}{10}$. Ventral spine, $1\frac{2}{3}$ to $1\frac{7}{8}$ of fin and reaches further than pectoral, or at least to anal. Color in alcohol olive-brownish generally, largely uniform. Trunk with 5 or 6 inconspicuous dusky vertical bands, obsolete with age. Blackish opercular blotch less than eye. Dusky blotch at soft dorsal origin less than eye, less defined with age. Last dorsal and caudal rays with small round pale spots surrounded with deeper brownish. Five examples, 183 to 187 mm., from the Quanza River at Cunga.

HEMICHROMIS FASCIATUS Peters.

Seven examples from the Quanza River.

LAGOCEPHALUS LAEVIGATUS (Linnaeus).

One from Loando, 476 mm., compared with an example of equal size from Cape May, New Jersey, is indistinguishable. Also 2 smaller examples, 260 and 450 mm., same data. The lateral line seems variable in some cases and may appear broken or several times interrupted. Also 2 young in poor preservation, included previously under Sierra Leone, have 3-rooted conspicuous abdominal spines. Sides of body, especially below pectoral, with many large blackish round spots, nearly large as pupil. Back blue-black, sides and below bright silvery-white.

SPHEROIDES SPENGLERI (Bloch).

Upon comparison with a series of examples from Massachusetts, Florida, the Bahamas, and St. Martins, West Indies, my Loando example differs in coloration. In American material the caudal always shows a dark or black basal and terminal crossband, and though present in the Angola example, narrower and with the addition of a broad dark median bar. The black round spots on the side of the head and trunk below are fewer, only about 6 distinct as 4 before pectoral and 2 behind, though very pale traces of others exist. Several larger black blotches below eye and slightly backward do not occur in the American examples, though conspicuous in the Loando example. Evermann and Marsh¹ figure an inflated example of *S. spengleri* which differs from a nearly inflated Bahama example before me in the dark blotches being so far removed from the pectoral, as in all my material the seventh blotch is behind and scarcely at all below the pectoral base. The row is also continuous and not broken before the caudal peduncle in my material, and the upper 3 spots behind the pectoral, though present, are much higher.

ELEOTRIS VITTATA A. Duméril.

Head, $2\frac{3}{5}$ to 3; depth, 4 to $4\frac{4}{5}$; D. VI—I, 8, 1; A. I, 8, 1; scales 38 from shoulder to caudal base medially, and 8 more on latter; 17 scales transversely between soft dorsal and anal origins; 44 predorsal scales; snout, $4\frac{1}{2}$ in head; eye, $6\frac{1}{2}$; maxillary, $2\frac{3}{5}$; interorbital, 4. Body depressed in front, compressed behind. Head width, $1\frac{3}{4}$ its length. Caudal peduncle long, compressed; least depth, $1\frac{3}{5}$ its length and $3\frac{1}{5}$ in head. Snout wide, convex; length half its width. Eye well advanced: hind edge at first third in head measured from mandible tip. Maxillary nearly to hind pupil edge, greatly inclined;

¹ Bull. U. S. Fish Comm., vol. 20, pt. 1, 1900, p. 267, fig. 79.

expansion, $1\frac{3}{8}$ in eye. Teeth, fine, in rather broad bands. Mandible protrudes little in front. Tongue wide, smooth, free; front slightly emarginate. Front nostril midway in snout and hind one close over upper front eye edge. Interorbital depressed concavely. Preopercle with concealed spine directed down. Rakers about 4 + 6 rudimentary tubercles and filaments nearly equal eye. Scales on predorsal, about spinous dorsal base, head, breast, and belly, cycloid, circuli complete, and basal striae about 18. Scales on trunk largely ctenoid; basal striae about 32. Muzzle, most of mandible, cheeks in front and below, naked. First dorsal inserted about midway between front pupil edge and hind dorsal ray base, second spine $2\frac{1}{2}$ in head. Soft dorsal inserted about midway between pectoral origin and middle of caudal peduncle length; seventh ray 2 in head, also seventh anal ray same. Caudal long, rounded, $1\frac{1}{2}$ in head, pectoral $1\frac{1}{2}$, ventral 2.

Color in alcohol deep warm brown, paler on under surfaces of head and abdomen. Deep brown streak from eye to shoulder, where widening as broad blackish band to upper basal part of caudal. Back and sides also mottled with deep brown. Two dark streaks back over cheek from lower hind eye edge and branchiostegal region mottled with dull umber, also muzzle. Iris brown. Fins all finely crossbarred with deep brown, coarser bands on spinous dorsal. One from the Quanza River, 165 mm.

MAPO SOPORATOR (Valenciennes).

Head, 3 to $3\frac{1}{8}$; depth, $4\frac{1}{3}$ to $4\frac{1}{2}$; D. VI—I, 8, 1 or 9, 1; A. I, 8, 1; scales, 36 to 38 from shoulder to caudal base medially and 3 or 4 more on latter; 13 to 16 scales transversely between soft dorsal and anal origins; 26 to 33 predorsal scales; snout, $3\frac{3}{4}$ to $4\frac{1}{5}$ in head; eye, $4\frac{1}{2}$ to $5\frac{1}{5}$; maxillary, $2\frac{1}{4}$ to $2\frac{1}{2}$; interorbital, $6\frac{3}{4}$ to 8. Body moderately compressed. Caudal peduncle moderately long, well compressed; least depth about three-fourths to four-fifths its length, or $2\frac{1}{5}$ to $2\frac{1}{4}$ in head. Head width, $1\frac{2}{5}$ to $1\frac{1}{2}$ its length. Snout rather broad, convex; length, two-thirds to three-fourths its width. Eye well advanced; center near first third in head length, which is more backward in smaller examples; impinging on upper profile. Maxillary to hind pupil edge in smaller example, to eye in larger. Jaws about equal. Teeth villiform, outer row enlarged, in narrow bands in jaws. Tongue thick, smooth, free, with slight median notch in front. Front nostril little nearer eye than snout tip and hind nostril close before eye. Interorbital concave. Rakers, six short, weak, inconspicuous rudimentary tubercles; filaments about half of eye. Scales crowded on predorsal, breast, and belly. Predorsal scales cycloid, with about 14 basal striae and circuli rather obsolete. Head naked, except occiput. Body scales ctenoid; circuli distinct and about 22 to 32

basal striae. First dorsal inserted little nearer snout tip than last dorsal ray base, or about midway between snout tip and sixth dorsal ray base; first spine, $1\frac{1}{2}$ to 2 in head. Soft dorsal inserted little nearer caudal base than eye, seventh or eighth rays, $1\frac{2}{3}$ to $2\frac{1}{2}$ in head. Anal opposite, similar. Caudal rounded; $1\frac{1}{2}$ to $1\frac{1}{4}$ in head; pectoral, $1\frac{1}{2}$ to $1\frac{2}{5}$; ventral, $1\frac{1}{2}$ to $1\frac{2}{3}$.

Color in alcohol uniform brown, paler or whitish on under surface of head and abdomen. About 5 broad darker crossbands and each row of scales with longitudinal dark streak. Head mottled brownish above and on sides. Dusky blotch size of pupil close behind eye, which brown. Dorsals and caudals finely crossbarred with darker; other fins brownish. Length, 85 to 125 mm.

One from the Quanza River at Cunga, and the others previously listed as 5 from the Elmina River in Ashantee and 1 from Mount Coffee in Liberia. An examination of scales of Florida and Bermuda examples shows them in complete agreement with the above.

10. CAPE TOWN, CAPE COLONY.

Though the literature of South African ichthyology is quite extensive, most is recent. The first faunal work is contained in Sir Andrew Smith's account of the fishes in his *Zoology of South Africa*.¹ Later Bleeker² and Castelnau³ described some species, Gunther a *Lophotes*,⁴ and more recently numerous papers have appeared by Boulenger,⁵ Gilchrist,⁶ Gilchrist and Thompson,⁷ and Thompson.⁸ Five species were obtained by the Eclipse expedition.

LIZA RAMADA (Risso).

Head, $3\frac{3}{5}$; depth, 4; D. IV-I, 8; A. III, 9; scales, 44 from shoulder to caudal base medially and 4 more on latter; 14 scales between soft dorsal and anal origins; 32 predorsal scales; snout, $3\frac{1}{2}$ in head; eye, 6; maxillary, 4; interorbital, $2\frac{1}{4}$. Rakers about 40+60 fine, $1\frac{1}{2}$ in filaments and latter $1+\frac{1}{8}$ eye-diameters. Preorbital edge rather

¹ Zool. S. A., Pisces, vol. 4, 1849, 31 pls. (letterpress not numbered).

² Nat. Tijds. Ned. Ind., vol. 31, 1860, pp. 49-80. Nat. Tijds. Dierk., vol. 2, 1863, pp. 75-76, 250-269. Versl. K. Afs. Wet. Amsterdam, vol. 15, 1863, pp. 456-459.

³ Comptes Rendu Acad. Sci., Paris, vol. 1, 1860, 788-789.

⁴ Proc. Zool. Soc. London, 1890, pp. 244-247, 2 pls.

⁵ Marine Invest. S. Afric., vol. 1, 1898, pp. 1-4; vol. 2, 1900, No. 8, pp. 10-12, pl. 3, 13 pls.; vol. 1, 1902, pp. 1-4, 8-9; vol. 2, 1903, pp. 167-169, pls. Ann. S. Afric. Mus., vol. 1, 1899, pp. 379-380, pl.; vol. 2, 1901, pp. 227-228. Rep. Marine Biol., Cape G. Hope, 1898 (1899), pp. 196-197. Ann. Mag. Nat. London, ser. 7, vol. 9, 1902, pp. 335-336, fig.; ser. 7, vol. 14, 1904, pp. 16-20.

⁶ Trans. S. Afric. Philos. Soc., vol. 10, 1899, p. viii. Marine Invest. S. Afric., vol. 1, 1901 (1902), No. 6, pp. 97-179; vol. 2, 1902, pp. 101-113, 6 pls.; vol. 3, 1903, pp. 13-16, 18 pls., pp. 203-211, 10 pls.; vol. 4, 1908, pp. 43-171, 14 pls. Trans. Roy. Soc. S. Afric., vol. 3, 1913, pp. 33-35, fig. Marine Biol. Rep. Union S. Afric., No. 1, 1913, pp. 46-66.

⁷ Ann. S. Afric. Mus., vol. 6, 1908, pp. 97-143, pp. 145-206, pp. 213-279; vol. 11, 1911, pp. 29-58, pp. 321-463, figs. S. Afric. Journ. Sci., vol. 7, 1911, pp. 214-224. Ann. Mag. Nat. London, ser. 7, vol. 8, 1911, pp. 477-478.

⁸ Marine Biol. Rep. Prov. Cape of Good Hope, 1914, No. 2, pp. 132-167.

coarsely serrated. Alar flap in pectoral axil well developed. Pectoral, $1\frac{3}{4}$ in head. First dorsal spine longest. Dull olive above, sides brassy, also lower surface. Length, 262 mm.

Compared with Mediterranean examples, 155 to 237 mm. long, the rakers were found shorter, very fine, and about long as the filaments, the latter equal to the eye. Their rakers are 50 to 72 + 66 to 90 on the right arch, and 50 to 72 + 65 to 96 on the left arch. The scales of the Mediterranean examples have 8 to 10 basal radii, while the African example has 12 to 14, a condition of age.

SCOMBER COLIAS Gmelin.

Head, $3\frac{1}{8}$; depth, 5; D. VIII-II, 10 + 5; A. III, 9 + 5; snout, $3\frac{1}{8}$ in head; eye, $4\frac{1}{2}$; maxillary, $2\frac{1}{2}$; interorbital, $3\frac{3}{8}$. Body rather cylindrical, but slightly compressed. Head width half its length. Snout conic; width, $1\frac{1}{2}$ its length; $1\frac{1}{4}$ in smaller example. Eye large, with broad adipose lid. Maxillary to pupil. Teeth minute, uniserial in jaws and on palatines. Few small teeth each side of vomer. Tongue sharp pointed, free. Front nostril simple pore about three-fourths of eye-diameter before eye, and hind nostril short slit close before eye. Interorbital convex, flattened medially. Rakers, 17 + 30, finely lanceolate, nearly long as eye, but slightly shorter than filaments. Scales small, largest behind pectoral base. Lateral line complete. Spinous dorsal midway between front nostril and soft dorsal origin; fin halfway to latter; second spine, $2\frac{1}{8}$ in head; first branched dorsal ray, $5\frac{1}{4}$. Anal inserted slightly behind soft dorsal origin, similar. Caudal well forked. Pectoral reaches about halfway in depressed spinous dorsal, $2\frac{1}{2}$ in head; ventral, $2\frac{1}{8}$ and inserted about first fourth in pectoral. Air-bladder present. Color in alcohol olive-brown on back, marked with obscure darker oblique streaks, which appear as obscure dusky spots or blotches below lateral line along upper sides. Pectoral axil deep brown; other fins all pale. Length, 406 mm.

Evermann and Kendall have compared Atlantic and Pacific examples of the previously admitted cosmopolitan *Scomber japonicus* Houttuyn, pointing out that *S. colias* of the Atlantic is valid in its smaller head, more advanced spinous dorsal, etc.¹ My comparison of Atlantic examples from such remote places as New Jersey, Italy, and the present, do not exhibit characters of specific value. The New Jersey and Italian examples have 12 to 15 + 25 to 30 rakers.

TRACHURUS SEMISPINOSUS (Nilsson).

Head, $3\frac{2}{5}$; depth, 4; D. VIII—I, 32; A. II—I, 27; scutes, 36 + 38; snout, $3\frac{2}{5}$ in head from upper jaw tip; eye, $3\frac{5}{8}$; maxillary, $2\frac{2}{5}$; interorbital, $3\frac{1}{2}$. Body well compressed, fusiform, deepest at spinous

¹ Proc. U. S. Nat. Mus., 1911, p. 38.

dorsal. Head pointed, lower profile more inclined. Snout long as broad. Eye large, adipose eyelids wide, hind pupil edge midway in head length. Maxillary to pupil. Lower jaw protrudes. Teeth minute, simple, uniserial in jaws. Row of similar teeth on palatines and small patch on vomer. Tongue pointed, free. Nostrils together, nearly width of pupil before upper front eye edge. Interorbital convex. Rakers about $18+48$, lanceolate, slender, equal filaments or about $1\frac{1}{4}$ in eye. Pseudobranchiae about three-fifths of gill-filaments. Scales small, scutes in lower straight section of lateral line broader. Spinous dorsal origin about midway between front eye edge and soft anal origin in vertical, third spine longest. Soft dorsal inserted nearly midway between front nostril and caudal base, front rays little elevated. Soft anal similar, inserted about midway between hind eye edge and caudal base. Caudal (tips damaged) about $1\frac{2}{3}$ in head. Pectoral not quite to soft anal origin. Ventral close behind pectoral base, three-fourths to spinous anal and vent close before latter. Color in alcohol uniform brownish, paler below, and body largely with brassy reflections. Black opercular spot little smaller than pupil. Pectoral axil black. Other fins all pale brownish. Dorsal tip and outer portions of soft dorsal and anal each with dark brownish tinge. Length, 331 mm.

Though I have no European examples for comparison, the above seems to agree with Nilsson's account,¹ he giving but 75 scutes, of which were 38 spiny.

POMATOMUS SALTATRIX (Linnaeus).

Head, $3\frac{2}{3}$; depth, $3\frac{2}{3}$; D. VIII—II, 25; A. II, 28; scales in lateral line (damaged) 85 (?) to caudal base and 6 more on latter, 9 above, and 16 below; snout, $3\frac{1}{2}$ in head, measured from upper jaw tip; eye, 6; maxillary, $2\frac{1}{10}$; interorbital, $3\frac{1}{2}$. Rakers, $3+8$, three-fourths of filaments, and latter $1\frac{1}{6}$ in eye. Pectoral, $1\frac{3}{4}$ in entire head length. Brown blotch at pectoral base. Length, 396 mm.

I have no examples over a foot in length for comparison, and these from Massachusetts, New Jersey, and Rio Janeiro. They all show but 11 developed rakers on the lower arch, the formula so far examined always $3+11$. The scales show no differences except characters of age. The American examples have but few scale denticles, and usually with the numerous circuli unbroken, likely due to their adolescence. The Cape example has strongly denticulated scales and several basal striae.

DENTEX ARGYROZONA Valenciennes.

Head, $2\frac{7}{8}$; depth, $2\frac{2}{3}$; D. XII, 10, 1; A. III, 8; scales, 56 in lateral line to caudal base and about 7 more on latter; 7 scales above lateral

¹ Prodr. Ich. Scand., 1832, p. 38. In sinu. Codano & Mari Norvegica.

line and 15 below; about 60 predorsal scales; snout, $3\frac{1}{10}$ in head; eye, $4\frac{2}{5}$; maxillary, $2\frac{2}{5}$; interorbital, $3\frac{3}{4}$.

Body well compressed, contour elongately ellipsoid. Caudal peduncle compressed, least depth $1\frac{2}{5}$ its length. Head elongately triangular, upper profile slightly more inclined, well compressed with flattened sides but slightly constricted below. Snout convex, slightly so in profile and width about $1\frac{1}{2}$ its length. Eye large, little elevated, advanced so hind pupil edge about midway in head length. Maxillary to pupil, expansion slightly less than half of eye. Teeth uniserial. Two large curved canines in front of each jaw and front pair of smaller ones in upper. Upper teeth smaller than lower, less developed, and largely concealed in coriaceous lips. Vomer and palatines entire. Tongue depressed, pointed, little free. Nostrils close together, little before eye. Interorbital convex. Greatest preorbital width equals eye. Preopercle edge entire. Rakers about $10+17$, three-fifths of filaments, which $1\frac{2}{3}$ in eye. Scales finely ctenoid, largely uniform, though smaller on top of head, caudal base, and sheaths along bases of vertical fins. Cheek with 8 rows of scales. Axillary ventral scaly flap $2\frac{1}{2}$ in fin. Lateral line of simple tubes. Dorsal origin slightly behind pectoral origin; spines slender, fourth spine, $2\frac{2}{5}$ in head. Soft dorsal origin about midway between bases of caudal and fourth dorsal spine, rays sloping down behind and first $3\frac{2}{5}$ in head. Spinous anal inserted about opposite soft dorsal origin; second spine 4 in head, though third (damaged) longest. Soft anal like soft dorsal. Caudal well emarginate behind; upper lobe $1\frac{1}{2}$ in head. Pectoral nearly to vent, which close before vent, $1\frac{1}{2}$ in head; ventral, 2.

Color in alcohol uniform brownish generally, silvered and brassy reflections on sides below, which region also generally paler. Iris, brown. Fins, dull brown. Length, 293 mm.